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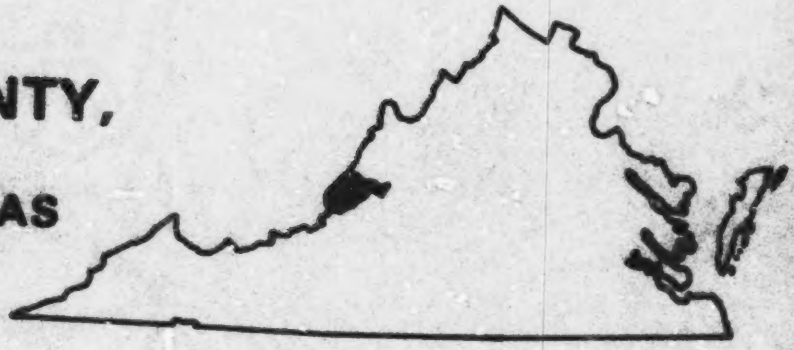
FLOOD INSURANCE STUDY

COMPLETED

ORIGINAL

ALLEGHANY COUNTY, VIRGINIA
UNINCORPORATED AREAS



JULY 16, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 510009

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Potts Creek	Panels 22P-24P
Cowpasture River	Panels 25P-27P
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Exhibit 2 - Flood Insurance Rate Map Index and Street Index
Flood Insurance Rate Map

Exhibit 3 - Elevation Reference Marks

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FLOOD INSURANCE STUDY
UNINCORPORATED AREAS OF ALLEGHANY COUNTY, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Alleghany County, Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Army Corps of Engineers (COE), Norfolk District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-1153, Project Order No. 1, Amendment No. 15. This work was completed in July 1985.

1.3 Coordination

In April 1983, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, Alleghany County, the COE (the study contractor), the Virginia State Water Control Board, and the U. S. Forest Service to determine the streams to be studied by detailed methods.

Various State and Federal agencies were contacted in order to minimize possible hydraulic and hydrologic conflicts. A search for basic data was made at all levels of government.

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On May 14, 1986, the results of the study were reviewed at a final CCO meeting attended by representatives of FEMA, the county, the study contractor, and the Virginia State Water Control Board.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Alleghany County, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: the Jackson River from approximately 2,150 feet above its confluence with the James River to Gathright Dam; Dunlap Creek from its confluence with the Jackson River to approximately 120 feet upstream of the confluence of Mossy Run; Potts Creek from its confluence with the Jackson River to State Route 18; the Cowpasture River from approximately 2,300 feet above its confluence with the James River to approximately 2,440 feet upstream of the west bound lane of Interstate Route 64; Simpson Creek from its confluence with the Cowpasture River upstream to approximately 4.8 miles upstream at an access road; and Smith Creek for its entire length within the county. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1990.

The following flooding sources in the county were studied by approximate methods: Hughes Draft, Lake Moomaw, Jones Hollow, Ogle Creek, Johnson Creek, Cove Run, Dry Branch, Goff Hollow, Indian Hollow, Blue Spring Run, Hoover Creek, Cedar Creek, Board Tree Run, Dry Run, Indian Draft, Falling Spring Creek, Roaring Run, Wilson Creek, Dolly Ann Hollow, Pounding Mill Creek, Sharvers Creek, Cowpasture River, Piney Mountain Branch, Blue Suck Branch, Downy Branch, Simpson Creek, North Branch, Roses Run, Johnsons Creek, Thorny Branch, Dunlap Creek, Moss Run, South Fork, Tygers Creek, Jerrys Run, Big Run Pond, Suck Branch, Johns Run, Laurel Branch, Cast Steel Run, Potts Creek, Hardy Run, Harmon Run, Hays Creek, Millstone Run, Blue Spring Run, Still Run, White Rock Creek, Crow Run, Little Crow Run, Falls Hollow, Solomons Run, Bens Run, Kempers Run, Christleys Run, Sugar Run, Mill Branch, Patton Branch, Nelse Branch, Wylies Run, Robinsons Branch, Hamilton Branch, Kyles Branch, Showers Run, Spring Creek, Cove Creek, Snake Run, Miller Branch, Big Branch, Potts Creek, Karnes Creek, and Pond Suck Hollow. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Alleghany County.

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APPROXIMATE SCALE

0 4 8 12 MILES

VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FIGURE 1

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2.2 Community Description

Alleghany County is located in the west-central portion of Virginia along the eastern slopes of the Allegheny Mountains. The unincorporated land area of the county is 445 square miles. Alleghany County is bordered by the unincorporated areas of Craig County to the south; the unincorporated areas of Botetourt County to the southeast; the unincorporated areas of Rockbridge County to the east; the unincorporated areas of Bath County to the north; and the unincorporated areas of Greenbrier and Monroe Counties, West Virginia, to the west. The 1983 estimated population for Alleghany County was 13,700, showing a decline of 633 from the 1980 Census of 14,333 (Reference 1).

Settlement in the area began prior to 1750, but development largely began after the Revolutionary War. Covington, the seat of Alleghany County, was designated as a town in 1819 and first incorporated in 1833. The county was formed in 1822 by an act of the Virginia General Assembly. The county is administered by an Administrator acting under an elected Board of Supervisors.

Alleghany County is located in the Valley and Ridge Province, which is underlain by sedimentary rocks. Strata are primarily limestone, shale, and sandstone originating from the Cambrian and Devonian eras.

The climate of the area is characterized by mild summers with temperatures averaging 70 degrees Fahrenheit (°F) in July. The winters are cool with temperatures averaging 34°F in January. Annual precipitation over the basin averages approximately 41 inches (Reference 2). The rainfall distribution is fairly uniform throughout the year, with some variation in the monthly averages.

The Jackson River flows to the south through the northern portion of the county until reaching the City of Covington. Here it turns and flows northeast joining the Cowpasture River and forms the James River near the county boundary. The Jackson River has a drainage area of 907 square miles at its mouth.

Dunlap Creek and Potts Creek, two main tributaries of the Jackson River, drain the southern portion of the county. Dunlap has a drainage area of 173 square miles and Potts contributes 172 square miles at their confluences with the Jackson River in the vicinity of Covington.

The Cowpasture River has a drainage area of 461 square miles at its mouth and passes through the eastern edge of the county before joining the Jackson River to form the James River.

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2.3 Principal Flood Problems

Floods have occurred and can be expected to occur in the county during all seasons of the year. The main flood season is generally in the winter and spring. Flooding, however, can occur during the summer and fall due to intense local thunderstorms or from tropical disturbances moving into the area from the Atlantic or Gulf coasts.

Alleghany County has experienced floods since the early settlement of the area. Large floods occurred in November 1877, March 1913, and March 1936 (Reference 3). More recently, floods occurred in March 1867, August 1969 (Hurricane Camille), June 1972 (Tropical Storm Agnes), March 1973, and December 1973.

Flood damage in the area was concentrated in and near the cities of Covington and Clifton Forge. Because of the sparse development in the county, remaining damages were widespread. Major damage resulted in washouts of bridges and roads. A high school along the Jackson River below Covington has been flooded several times.

Potentially, the greatest flood problem in the area is along the Jackson River. Since the completion of Gathright Dam, there has been widespread belief that flooding has been eliminated. This belief has brought increased pressure for development of the river's flood plain. In reality, the dam will reduce flooding, but it will not eliminate all flooding. Gathright Dam controls only approximately 38 percent of the Jackson River watershed, and has no control over Dunlap and Potts Creeks, which can add significantly to the Jackson River flow.

2.4 Flood Protection Measures

Gathright Dam, located on the Jackson River approximately 20 river miles upstream of Covington, has effectively controlled flooding originating on the 344 square miles of drainage area above the dam site. Initial filling operations began in December 1979. However, two major tributaries, Dunlap and Potts Creeks, enter the Jackson River at Covington and are sources of flooding affecting areas downstream of the dam. Although the reduciton in flood stages provided by Gathright Dam is substantial, it will not completely eliminate the flood hazards along the Jackson River downstream of Dunlap and Potts Creeks. The Westvaco Dam has no effect on reducing flood flows or flood elevations. There are no other flood protection structures within the county.

Alleghany County has no flood plain regulations. The Uniform Statewide Building Code states, "...where a structure is located in a 100-year flood plain, the lowest floor of all future construction or substantial improvement to an existing structure..., must be built at or above that

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level, except for non-residential structures which may be flood-proofed to that level" (Reference 4). These requirements will no doubt be beneficial in reducing future flood damages in the county.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

The Jackson and Cowpasture Rivers merge to form the James River just upstream of Lick Run. Flood flow frequencies were based on statistical analyses of stage-discharge records of gaging stations on the James River at Lick Run and on the Jackson River near Falling Spring.

Records of river stages and discharges on the James River at Lick Run have been maintained since April 3, 1925, when the U. S. Geological Survey (USGS) installed a non-recording gage at the Old Highway Bridge crossing the James River. On October 26, 1928, a recording gage was installed at the same site. To supplement the gage record, local residents and the Chessie System provided flood data dating back to 1877.

Records of river stages and discharges on the Jackson River at the Falling Spring gage, located approximately ten miles upstream of

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Covington, have been maintained since April 192 by the USGS. To supplement the Falling Spring record, data from the USGS gaging stations on Dunlap and Potts Creek have been used. These creeks are major tributaries entering the Jackson River in Covington, and are sources of flooding affecting the study area.

Data from the above gaging stations were used for defining the discharge-frequency relationships for the Jackson River. The discharges for the 10-, 50-, 100-, and 500-year floods were developed by applications of procedures described in Statistical Methods in Hydrology by Leo R. Beard (Reference 5). Adjustments were made to reflect the effects of Gathright Dam.

Since October 1928, the USGS has maintained records of river stages and discharges at the Dunlap Creek gage, located 4.3 miles above its confluence with the Jackson River. The peak discharge frequency relationships were developed by application of procedures outlined in Bulletin 17B, "Guidelines for Determining Flood Flow Frequency," (Reference 6). There were no adjustments made to the statistics.

Records of river stages and discharges on the Potts Creek gage, located 7.5 miles upstream of the confluence with the Jackson River, have been maintained from October 1928 to September 1956 and October 1965 to date by the USGS. Flood flow frequency data were based on Log Pearson Type III statistical procedures outlined in Bulletin 17B (Reference 6). The statistics were adjusted based on the knowledge that the 1913 flood was the largest since at least 1877.

The USGS has maintained records of river stages and discharges on the Cowpasture River at the Clifton Forge gage, located 2.5 miles above the confluence with the Jackson River, since March 1925. The statistical analysis of the discharge records followed the standard Log-Pearson Type III method outlined in Bulletin 17B (Reference 6). The statistics were adjusted for one low outlier and one historic event.

Simpson Creek, an ungaged watershed, is a tributary of the Cowpasture River. Several synthetic and regional analyses were performed based on basin characteristics and rainfall-runoff relationships. Comparisons were made to nearby gaged data and to previous analyses performed in the upper James River Basin. The method described in the report for "Synthetic Flood Frequency," produced results most consistent with the previous analyses and nearby gaged data (Reference 7). These were used to determine peak discharge relationships along Simpson Creek.

Discharges for Smith Creek were obtained from the Flood Insurance Study for the City of Clifton Forge (Reference 8). The analysis involved the application of rainfall-runoff amounts to a synthetic graph (unit hydrograph).

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A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
JACKSON RIVER					
At confluence with James River	907	20,000	34,000	41,000	64,000
Downstream of confluence of Potts Creek	797	20,000	34,000	41,000	64,000
Upstream of confluence of Potts Creek	625	15,000	25,000	31,000	47,000
Upstream of confluence of Dunlap Creek	440	11,000	12,000	13,000	20,000
DUNLAP CREEK					
At gage No. 02013000	164	10,500	16,400	19,100	26,200
Upstream of confluence of Ogle Creek	116	7,430	11,600	13,500	18,500
POTTS CREEK					
At confluence with Jackson River	173	8,470	12,600	14,500	19,300
At gage No. 02014000	153	7,470	11,100	12,800	17,000
COWPASTURE RIVER					
At gage No. 02016000	461	19,200	29,400	34,600	49,000
Upstream of confluence of Simpson Creek	429	17,900	27,400	32,200	45,600
SIMPSON CREEK					
Downstream of confluence of Blue Suck Branch and Piney Mountain Branch	24.3	3,790	5,890	6,870	9,540
Upstream of confluence of Blue Suck Branch and Piney Mountain Branch	18.1	2,810	4,630	5,350	7,530
SMITH CREEK					
At confluence with Jackson River	18	7,410	11,000	12,000	15,300

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3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for the Jackson River and Smith Creek were obtained by field surveys. Data on bridge elevations and structural geometry were obtained from bridge plans and from field survey measurements (Reference 9). Cross sections for the backwater analyses for Dunlap, Potts, and Simpson Creeks, and Cowpasture River were obtained from aerial photography at a scale of 1:14,400 (Reference 10). The inundated portion of the sections were obtained by field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 11). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. This computer model was calibrated using historic flood water profiles. Starting water-surface elevations were obtained from rating curves based on high-water data for the Jackson River, Dunlap Creek, Potts Creek, the Cowpasture River, and Simpson Creek. Starting water-surface elevations for Smith Creek were taken from a previous report prepared by the COE (Reference 12).

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and flood plain areas. Channel "n" and overbank "n" values for the streams studied by detailed methods are shown in the following tabulation:

Stream	Channel "n"	Overbank "n"
Jackson River	0.025 - 0.070	0.060 - 0.080
Dunlap Creek	0.045	0.112
Potts Creek	0.045 - 0.054	0.109 - 0.135
Cowpasture River	0.036	0.090
Simpson Creek	0.045	0.112
Smith Creek	0.045 - 0.060	0.045 - 0.060

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The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

For the streams studied by approximate methods, flood hazard boundaries were determined using high-water marks that had been set following major flooding in 1969 (Hurricane Camille) and 1972 (Tropical Storm Agnes). Normal depth calculations were also used in the absence of high-water data.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year flood plain boundaries and 100-year floodway to assist communities in developing flood plain management measures.

4.1 Flood Plain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries for the Jackson River, Dunlap Creek, Potts Creek, the Cowpasture River, and Simpson Creek were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 4 feet (Reference 13). Between cross sections, the boundaries for Smith Creek were interpolated using topographic maps at a scale of 1:24,000 with a contour intervals of 20 and 40 feet (Reference 14).

For the streams studied by approximate methods, the 100-year flood plain boundary was delineated using topographic maps (Reference 14).

The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood

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hazards (Zones A and AE), and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year flood plain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the flood plain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for the Jackson River, Potts Creek, and Smith Creek extend beyond the county boundary.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jackson River								
A	4,680	350/140[2]	4,660	8.8	1,014.8	1,014.8	1,015.1	0.3
B	6,880	255/90[2]	3,690	11.1	1,019.7	1,019.7	1,019.8	0.1
C	9,380	315/205[2]	4,260	9.6	1,025.0	1,025.0	1,026.0	1.0
D	12,425	245	3,900	10.5	1,031.9	1,031.9	1,032.2	0.3
E	14,280	265	4,070	10.1	1,039.8	1,039.8	1,039.8	0.0
F	15,060	245	4,110	10.0	1,041.6	1,041.6	1,041.6	0.0
G	27,810	235/225[2]	4,700	8.7	1,068.9	1,068.9	1,068.9	0.0
H	28,880	355/335[2]	5,460	7.5	1,069.7	1,069.7	1,069.7	0.0
I	32,810	255	3,280	12.5	1,073.0	1,073.0	1,073.2	0.2
J	37,885	175	3,120	13.2	1,085.3	1,085.3	1,085.5	0.2
K	41,000	410	6,350	6.5	1,092.4	1,092.4	1,092.7	0.3
L	45,150	240	3,400	12.0	1,097.7	1,097.7	1,098.5	0.8
M	48,940	305	4,190	9.8	1,105.6	1,105.6	1,105.7	0.1
N	49,830	250	3,780	10.8	1,106.7	1,106.7	1,106.7	0.0
O	53,830	255	3,750	10.9	1,112.5	1,112.5	1,113.0	0.5
P	58,370	240	3,560	11.5	1,119.5	1,119.5	1,119.5	0.0
Q	62,150	420	5,690	7.2	1,126.7	1,126.7	1,126.9	0.2
R	64,250	270	4,210	9.7	1,131.7	1,131.7	1,131.7	0.0
S	67,570	220	3,100	13.2	1,138.9	1,138.9	1,138.9	0.0
T	70,810	200	3,490	11.7	1,150.7	1,150.7	1,150.9	0.2
U	73,870	255	4,260	9.6	1,156.9	1,156.9	1,157.3	0.4
V	77,530	255	5,460	7.5	1,164.0	1,164.0	1,164.2	0.2

[1]Feet above confluence with James River
[2]Width/width within county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
ALLEGHANY COUNTY, VA
(UNINCORPORATED AREAS)

FLOODWAY DATA

JACKSON RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jackson River (continued)								
W	79,930	245	4,080	10.0	1,168.2	1,168.2	1,168.5	0.3
X	82,620	315	4,020	10.2	1,172.7	1,172.7	1,172.8	0.1
Y	85,210	305	3,980	10.3	1,176.7	1,176.7	1,176.8	0.1
Z	87,580	290	4,040	10.2	1,179.8	1,179.8	1,179.8	0.0
AA	90,230	365	4,740	8.6	1,184.3	1,184.3	1,184.4	0.1
AB	94,025	350/280[2]	4,450	9.2	1,190.4	1,190.4	1,191.2	0.8
AC	96,200	660/105[2]	8,400	4.9	1,195.2	1,195.2	1,195.6	0.4
AD	107,615	305/85[2]	4,680	6.6	1,207.4	1,207.4	1,208.3	0.9
AE	121,520	380/110[2]	5,100	6.1	1,227.3	1,227.3	1,227.8	0.5
AF	122,430	260/160[2]	4,960	6.2	1,228.1	1,228.1	1,228.7	0.6
AG	123,040	245/125[2]	4,630	6.7	1,228.5	1,228.5	1,229.2	0.7
AH	123,970	185/65[2]	3,500	8.9	1,229.1	1,229.1	1,229.7	0.6
AI	124,810	330/25[2]	5,340	5.8	1,231.0	1,231.0	1,231.9	0.9
AJ	125,365	540/355[2]	7,630	4.1	1,231.8	1,231.8	1,232.7	0.9
AK	126,000	515/430[2]	7,540	4.1	1,232.3	1,232.3	1,233.2	0.9
AL	126,880	375/265[2]	8,230	3.8	1,232.7	1,232.7	1,233.6	0.9
AM	132,305	150/85[2]	1,900	6.8	1,237.9	1,237.9	1,238.1	0.2
AN	135,020	135/85[2]	1,160	11.2	1,242.5	1,242.5	1,242.5	0.0
AO	137,225	200/50[2]	2,120	6.1	1,246.2	1,246.2	1,246.8	0.6
AP	139,630	265	2,210	6.1	1,249.0	1,249.0	1,250.0	1.0
AQ	142,500	185	1,830	7.1	1,253.2	1,253.2	1,253.7	0.5

[1]Feet above confluence with James River
[2]Width/width within county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
ALLEGHANY COUNTY, VA
(UNINCORPORATED AREAS)

FLOODWAY DATA

JACKSON RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jackson River (continued)								
AR	145,250	440	2,940	4.4	1,257.2	1,257.2	1,257.6	0.4
AS	151,970	235	2,370	5.5	1,271.1	1,271.1	1,271.4	0.3
AT	153,630	420	2,800	4.6	1,275.1	1,275.1	1,275.1	0.0
AU	155,390	375	2,730	4.8	1,278.7	1,278.7	1,279.1	0.4
AV	158,380	305	3,030	4.3	1,285.4	1,285.4	1,286.1	0.7
AW	163,335	175	2,390	5.4	1,293.7	1,293.7	1,294.0	0.3
AX	166,880	200	2,380	5.5	1,299.4	1,299.4	1,300.1	0.7
AY	174,400	185	2,160	6.0	1,314.9	1,314.9	1,315.4	0.5
AZ	177,205	215	2,470	5.3	1,320.7	1,320.7	1,320.9	0.2
BA	185,890	190	1,920	6.8	1,335.6	1,335.6	1,335.6	0.0
BB	190,580	250	1,690	7.7	1,345.3	1,345.3	1,345.3	0.0
BC	193,170	255	1,980	6.6	1,351.9	1,351.9	1,351.9	0.0
BD	199,930	205	2,170	6.0	1,365.8	1,365.8	1,366.0	0.2
BE	208,040	180	2,480	5.2	1,376.9	1,376.9	1,377.6	0.7
BF	214,015	235	2,170	6.0	1,387.6	1,387.6	1,388.4	0.8
BG	220,230	160	1,640	7.9	1,395.6	1,395.6	1,396.0	0.4
BH	226,610	260	1,960	6.6	1,405.0	1,405.0	1,405.2	0.2
BI	229,190	140	950	13.6	1,417.2	1,417.2	1,417.2	0.0

[1]Feet above confluence with James River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FLOODWAY DATA

JACKSON RIVER

BEST COPY AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Dunlap Creek								
A	420	205	2,500	7.6	1,234.0	1,234.0	1,234.5	0.5
B	3,880	400	4,560	4.2	1,241.8	1,241.8	1,242.4	0.6
C	7,430	275	3,820	5.0	1,247.5	1,247.5	1,248.4	0.9
D	9,690	315	2,000	9.6	1,256.8	1,256.8	1,256.9	0.1
E	11,390	300	3,590	5.3	1,264.4	1,264.4	1,264.4	0.0
F	13,880	210	2,110	9.1	1,267.5	1,267.5	1,268.3	0.8
G	17,090	210	2,710	7.1	1,277.5	1,277.5	1,278.2	0.7
H	20,790	240	3,330	5.7	1,304.6	1,304.6	1,304.9	0.3
I	23,270	400	4,330	4.4	1,311.7	1,311.7	1,312.3	0.6
J	23,970	400	4,640	4.1	1,315.0	1,315.0	1,315.3	0.3
K	25,950	400	4,190	4.6	1,323.3	1,323.3	1,323.9	0.6
L	27,420	190	2,820	6.8	1,326.1	1,326.1	1,326.5	0.4
M	30,770	195	1,910	10.0	1,341.5	1,341.5	1,341.6	0.1
N	32,830	170	1,910	10.0	1,353.8	1,353.8	1,353.8	0.0
O	33,330	170	1,890	10.1	1,356.1	1,356.1	1,356.3	0.2
P	34,230	390	3,920	3.4	1,362.8	1,362.8	1,362.8	0.0
Q	35,670	475	3,140	4.3	1,364.9	1,364.9	1,365.1	0.2
R	38,160	260	2,860	4.7	1,372.2	1,372.2	1,373.0	0.8
S	40,820	900	5,310	2.5	1,377.9	1,377.9	1,378.8	0.9
T	43,020	700	3,640	3.7	1,383.5	1,383.5	1,384.5	1.0
U	46,160	600	3,520	3.8	1,394.5	1,394.5	1,395.0	0.5
V	47,750	500	3,460	3.9	1,398.9	1,398.9	1,399.6	0.7
W	50,520	800	5,220	2.6	1,405.7	1,405.7	1,406.6	0.9

[1]Feet above confluence with Jackson River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FLOODWAY DATA

DUNLAP CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Potts Creek								
A	680	390/320 [2]	4,520	3.2	1,203.1	1,203.1	1,204.0	0.9
B	950	225	3,890	3.7	1,203.4	1,203.4	1,204.2	0.8
C	1,070	205	3,000	4.8	1,204.1	1,204.1	1,204.7	0.6
D	3,480	355	2,700	5.4	1,206.8	1,206.8	1,207.4	0.6
E	5,990	355	4,210	3.4	1,211.4	1,211.4	1,211.7	0.3
F	8,390	305	3,050	4.8	1,215.4	1,215.4	1,215.6	0.2
G	10,630	280	2,700	5.4	1,220.0	1,220.0	1,220.2	0.2
H	12,760	255	2,200	6.6	1,225.5	1,225.5	1,225.6	0.1
I	14,890	265	3,220	4.5	1,232.2	1,232.2	1,232.4	0.2
J	16,670	420	3,550	4.1	1,235.4	1,235.4	1,235.7	0.3
K	18,960	230	2,800	5.2	1,239.7	1,239.7	1,239.9	0.2
L	20,580	200	2,690	5.4	1,242.9	1,242.9	1,243.0	0.1
M	23,430	295	2,560	5.7	1,248.6	1,248.6	1,248.8	0.2
N	25,900	305	2,600	4.9	1,255.7	1,255.7	1,255.7	0.0
O	27,860	225	2,300	5.6	1,260.4	1,260.4	1,260.6	0.2
P	30,730	280	2,130	6.0	1,268.6	1,268.6	1,268.8	0.2
Q	32,090	375	3,640	3.5	1,273.9	1,273.9	1,274.3	0.4
R	33,040	880	3,300	3.9	1,274.9	1,274.9	1,275.4	0.5
S	35,380	485	2,960	4.3	1,279.9	1,279.9	1,280.0	0.1
T	38,620	285	2,210	5.8	1,286.5	1,286.5	1,287.0	0.5

[1] Feet above confluence with Jackson River
[2] Width/width within county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FLOODWAY DATA

POTTS CREEK

BEST COPY AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Cowpasture River								
A	4,120[1]	420	5,180	6.7	1,014.8	1,013.4[3]	1,013.7	0.3
B	6,200[1]	295	3,990	8.7	1,015.8	1,015.8	1,016.1	0.3
C	10,070[1]	540	6,240	5.5	1,021.6	1,021.6	1,022.2	0.6
D	13,250[1]	425	4,910	7.0	1,025.2	1,025.2	1,026.2	1.0
E	15,440[1]	420	5,440	6.4	1,029.1	1,029.1	1,029.9	0.8
F	24,720[1]	485	5,180	6.7	1,043.3	1,043.3	1,043.5	0.2
G	27,090[1]	425	5,490	6.3	1,047.5	1,047.5	1,047.8	0.3
H	28,130[1]	690	7,680	4.5	1,049.8	1,049.8	1,050.3	0.5
I	29,180[1]	230	3,220	10.8	1,050.1	1,050.1	1,050.3	0.2
J	30,660[1]	740	6,440	5.4	1,053.8	1,053.8	1,054.2	0.4
K	33,120[1]	500	5,110	6.8	1,057.8	1,057.8	1,058.5	0.7
L	34,420[1]	400	3,830	9.0	1,059.6	1,059.6	1,060.0	0.4
M	36,070[1]	230	3,650	8.8	1,066.3	1,066.3	1,066.6	0.3
N	38,230[1]	550	6,690	4.8	1,070.0	1,070.0	1,070.1	0.1
Simpson Creek								
A	1,530[2]	110	1,210	5.7	1,071.0	1,071.0	1,072.0	1.0
B	1,760[2]	85	770	8.9	1,071.2	1,071.2	1,072.1	0.9
C	2,080[2]	70	510	13.4	1,079.3	1,079.3	1,079.4	0.1
D	2,970[2]	80	790	8.7	1,087.6	1,087.6	1,087.6	0.0
E	4,060[2]	100	670	10.2	1,092.8	1,092.8	1,092.8	0.0
F	5,630[2]	105	780	8.9	1,105.2	1,105.2	1,105.2	0.0
G	6,100[2]	100	1,180	5.8	1,113.3	1,113.3	1,113.3	0.0

[1]Feet above confluence with James River
[2]Feet above confluence with Cowpasture River
[3]Elevation computed without consideration of backwater effects from James River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FLOODWAY DATA

COWPASTURE RIVER - SIMPSON CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Simpson Creek (continued)								
H	8,220[1]	100	660	10.4	1,122.7	1,122.7	1,122.7	0.0
I	10,750[1]	95	790	8.7	1,145.8	1,145.8	1,146.5	0.7
J	13,240[1]	100	710	9.6	1,169.3	1,169.3	1,169.3	0.0
K	14,300[1]	90	530	11.5	1,179.3	1,179.3	1,179.4	0.1
L	16,120[1]	65	770	7.0	1,199.8	1,199.8	1,199.8	0.0
M	17,320[1]	75	520	10.3	1,215.6	1,215.6	1,215.6	0.0
N	18,200[1]	120	1,160	4.6	1,233.2	1,233.2	1,233.2	0.0
O	19,530[1]	195	1,510	3.5	1,254.9	1,254.9	1,254.9	0.0
P	21,530[1]	115	590	9.1	1,274.9	1,274.9	1,274.9	0.0
Q	22,950[1]	200	790	6.7	1,298.3	1,298.3	1,298.3	0.0
R	24,160[1]	155	660	8.1	1,316.3	1,316.3	1,316.3	0.0
S	25,490[1]	100	580	9.3	1,336.6	1,336.6	1,336.6	0.0
Smith Creek								
A	12,790[2]	155[3]	935	12.8	1,262.1	1,262.1	1,262.2	0.1
B	13,500[2]	325[3]	1,260	9.5	1,277.3	1,277.3	1,277.3	0.0

[1]Feet above confluence with Cowpasture River

[2]Feet above confuence with Jackson River

[3]This width extends beyond county boundary

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY COUNTY, VA

(UNINCORPORATED AREAS)

FLOODWAY DATA

SIMPSON CREEK - SMITH CREEK

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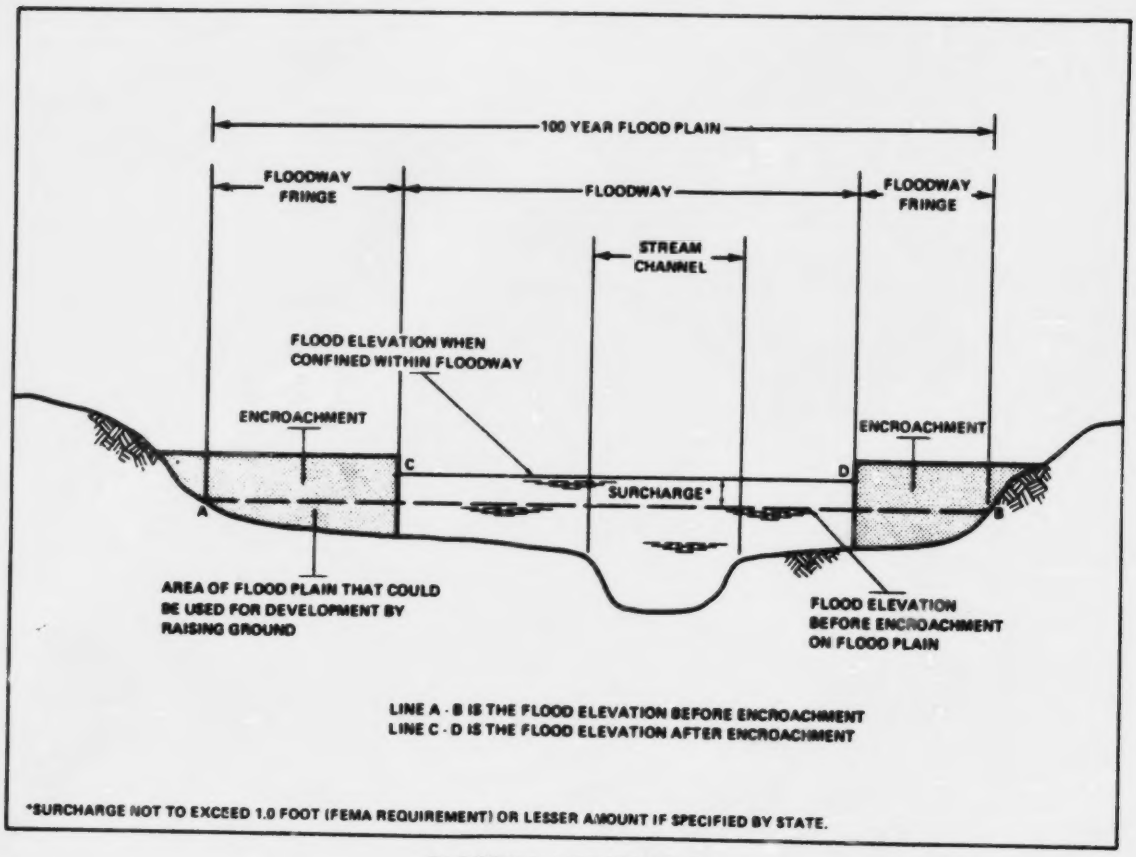
100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 2 for certain downstream cross sections of the Cowpasture River are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

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Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year flood plain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

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Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year flood plain, areas within the 500-year flood plain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and flood plain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year flood plains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year flood plains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies have been conducted for the Cities of Covington and Clifton Forge, and the unincorporated areas of Botetourt County (References 15, 8, and 16). The results of this study disagreed with portions of the published results in the Botetourt County study. In the Botetourt study, incorrect discharges were used in developing flood profiles for the lower

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Jackson River (a distance of 4,000 feet). Due to its more up-to-date analysis, this study has been determined to be correct. All other data in this study are in agreement with those studies.

A Flood Insurance Study for the Town of Iron Gate is currently being prepared (Reference 17). The results of that study will be in agreement with the results of this study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

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13. Aerial Data Reduction Association, Inc., of Pennsauken, New Jersey, Topographic Maps, Scale 1:2,400, Contour Interval 4 Feet: Alleghany County, Virginia, 1984.

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15. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Covington, Independent City, Virginia, Washington, D. C., January 3, 1979.

16. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Botetourt County, Virginia, Washington, D. C., June 15, 1978.

17. Federal Emergency Management Agency, Flood Insurance Study, Town of Iron Gate, Alleghany County, Virginia (Unpublished).

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EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	36	1,333.49	USC&GS gage on west bank on upstream side of Smith Bridge, State Route 721, over Jackson River.
RM 2	38	1,302.38	Chiseled square cut on southwest abutment of State Route 687 bridge over Jackson River.
RM 3	38	1,287.71	USC&GS disk stamped D2 1928 set in rock outcrop on north side of Chessie System tracks approximately 0.4 mile north-west of access road bridge over Jackson River.
RM 4	38	1,274.32	Chiseled square cut on northeast abutment of access road bridge over Jackson River at Clearwater Park.
RM 5	43	1,068.19	Nail in 12-inch cherry tree on west bank of Jackson River, 20 feet upstream of Ford Crossing at Dabney Lancaster College.
RM 6	43	1,165.01	USC&GS disk stamped PIKE 1957, 0.1 mile southwest of State Route 696, 88 feet northeast of power pole No. A-14, and 43 feet southwest of power pole A-13.
RM 7	44	1,051.43	Chiseled square cut on northeast abutment of Chessie System bridge over Jackson River, approximately 600 feet upstream of confluence of Wilson Creek.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 8	61	1,095.60	USC&GS disk stamped B 351 1958 set on top of 2X2 foot rock outcrop, approximately 0.1 mile south along U. S. Route 60 from intersection of U. S. Route 635, on west side of U. S. Route 60.
RM 9	62	1,328.47	USC&GS disk stamped BC 9 1944 1329 across U. S. Route 60 from Lucy Seline Motel set on top of concrete step leading to garden and residence 270 feet west of intersection of U. S. Route 60 and State Route 770.
RM 10	62	1,246.48	USC&GS disk stamped X 350 1958 on southeast concrete headwall of 4X4 concrete box culvert under U. S. Route 60 approximately 1.0 mile southwest of intersection of U. S. Route 60 and State Route 770.
RM 11	63	1,091.87	USC&GS disk stamped R 353 1958 set in rock outcrop projecting 1 foot above ground, 17.3 feet southwest of centerline of U. S. Route 220, approximately 350 feet north of Town of Iron Gate corporate limits.
RM 12	63	1,030.33	Chiseled square cut on northwest abutment of State Route 633 bridge over Cowpasture River.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 13	63	1,073.93	Chiseled square above State Highway Department plaque cut on southwest abutment of U. S. Route 60 bridge over Cowpasture River.
RM 14	64	1,112.28	USC&GS disk stamped Z 350 1958 set in southeast abutment of U. S. Route 60 bridge over Simpson Creek.
RM 15	64	1,176.17	USC&GS disk stamped BC 8 1944 1176 set on top of west end of concrete step leading to residence of Mr. H. H. Wilson, 27.5 feet north of centerline of U. S. Route 60.
RM 16	64	1,175.69	Chiseled square cut on northeast curb of U. S. Route 60 bridge over Simpson Creek.
RM 17	64	1,197.10	Chiseled square cut on southwest abutment of access road bridge over Simpson Creek.
RM 18	82	1,363.19	USC&GS disk stamped V 352 1958 set in southeast abutment of State Route 710 bridge over Dunlap Creek.
RM 19	84	1,410.79	USC&GS disk stamped Z 352 1958 set in northeast wing wall of Chessie System bridge over State Route 159.
RM 20	84	1,378.94	USC&GS disk stamped BC-45 set in southeast abutment of Chessie System bridge over Dunlap Creek.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 21	84	1,338.17	USC&GS disk stamped T 332 1958 set in northwest abutment of U. S. Route 60 bridge over Dunlap Creek.
RM 22	84	1,320.30	USC&GS disk stamped U 352 1958 set in northwest abutment of U. S. Route 60 bridge over Dunlap Creek.
RM 23	101	1,305.24	USC&GS disk stamped 46 BC set in northeast abutment of Chessie System bridge over Dunlap Creek.
RM 24	101	1,267.40	Chiseled square cut on southwest headwall of Boy's Home Road bridge over Dunlap Creek.
RM 25	101	1,316.26	USC&GS disk stamped J100 1935 approximately 300 feet southeast of Chessie System station at Interval, and approximately 45 feet east of centerline of U. S. Route 220.
RM 26	101	1,242.59	USC&GS disk stamped S 332 1958 set in northwest abutment of U. S. Route 60 bridge over Jackson River.
RM 27	103	1,226.01	Corps of Engineers disk stamped FIA COV 1, 1976 Norfolk District set in north side of concrete sidewalk along West Prospect Street on west side of North Craig Avenue.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 28	103	1,213.81	Corps of Engineers disk stamped FIA COV 4, 1976 Norfolk District set in concrete walk at northwest corner of brick building near intersection of West Jackson Road and South Rayon Drive.
RM 29	104	1,194.74	Corps of Engineers disk stamped FIA COV 6, 1976 Norfolk District set in concrete walk leading to one story brick residence at intersection of South Powhattan Avenue and East Gordon Street.
RM 30	104	1,378.43	USC&GS disk stamped M 352 1958 set in northwest abutment of U. S. Route 60 bridge over Pounding Mill Creek.
RM 31	104	1,178.21	USC&GS disk stamped K 352 1958 set in southeast abutment of eastbound lane of Interstate Route 64 bridge over Jackson River.
RM 32	106	1,152.75	VDH disk stamped H 352 1970 set in southeast abutment of U. S. Route 60 bridge over Jackson River.
RM 33	106	1,119.34	USC&GS disk stamped G 352 1958 set in southeast abutment of U. S. Routes 60/220 bridge over Karnes Creek.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 34	111	1,208.75	Chiseled square cut on northwest abutment of State Route 18 bridge over Potts Creek.
RM 35	111	1,206.81	60 penny nail in 18-inch sycamore tree on west bank of Potts Creek near access road bridge approximately 1 mile upstream of Covington city limits.
RM 36	111	1,213.47	USC&GS disk stamped BC 23 1213 1944 set in concrete steps on south side of State Route 18.
RM 37	111	1,221.20	Chiseled square cut on southeast end of culvert on State Route 18 under Bennetts Run.
RM 38	111	1,240.10	Chiseled square cut on southeast abutment of State Route 18 bridge over Potts Creek.
RM 39	111	1,301.72	USC&GS disk stamped 24 BC 1944 approximately 0.1 mile south of private road to dairy from State Route 18.
RM 40	111	1,276.16	Chiseled square cut on southeast abutment of State Route 18 bridge over Potts Creek, near Pond Lick Branch.
RM 41	113	1,293.73	Chiseled square cut on southeast abutment of State Route 18 bridge over Potts Creek.

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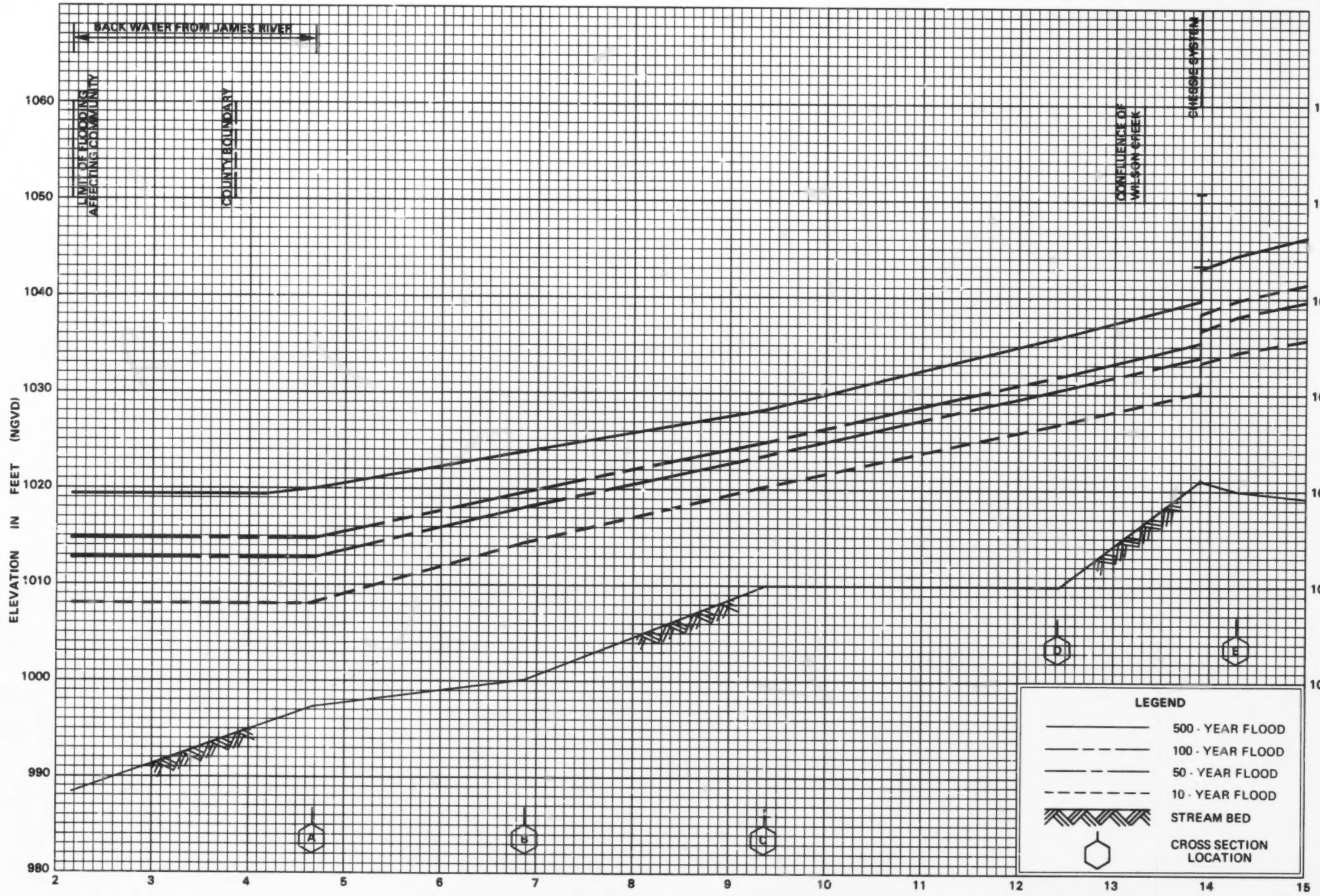

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

01P

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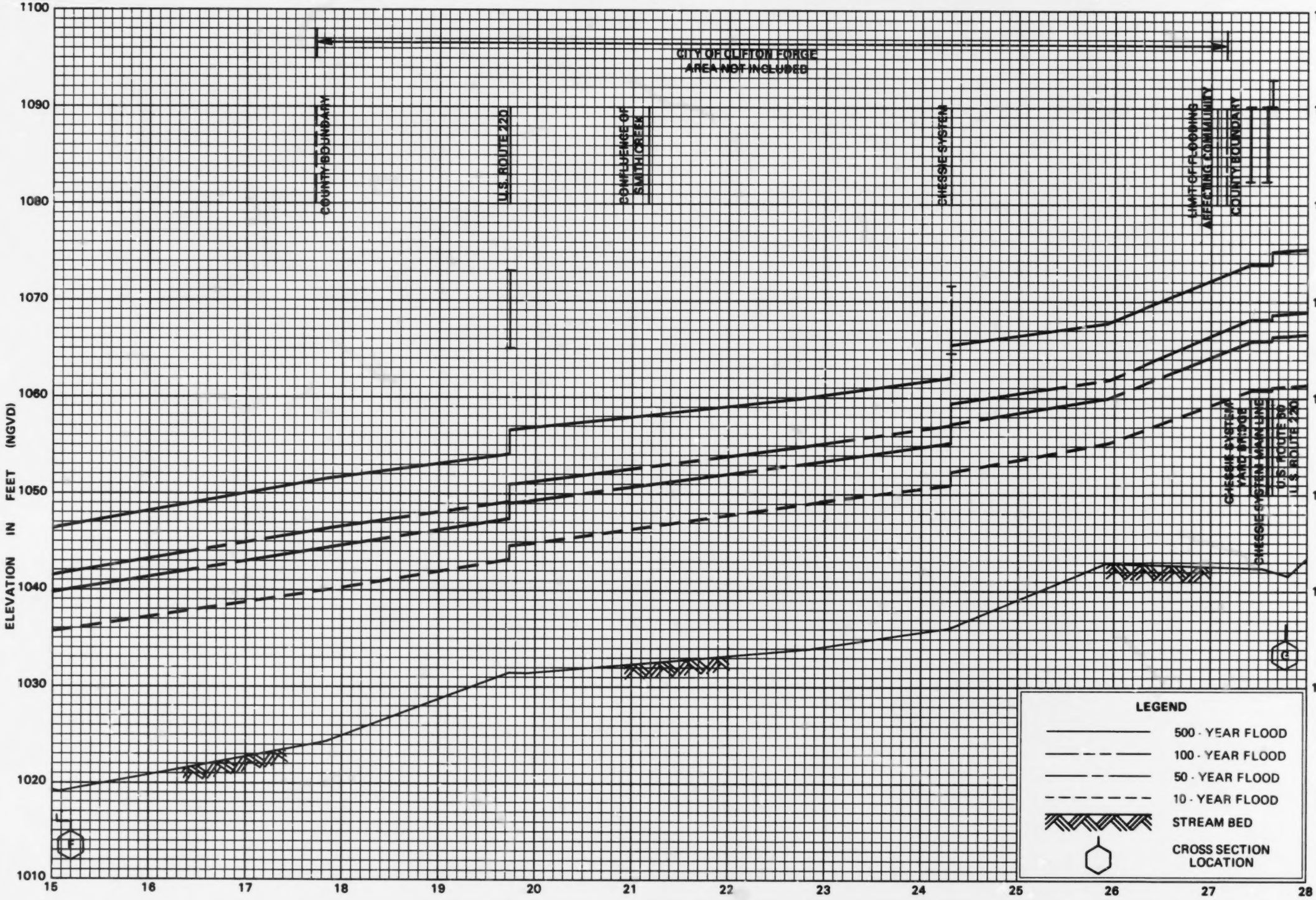

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

02P

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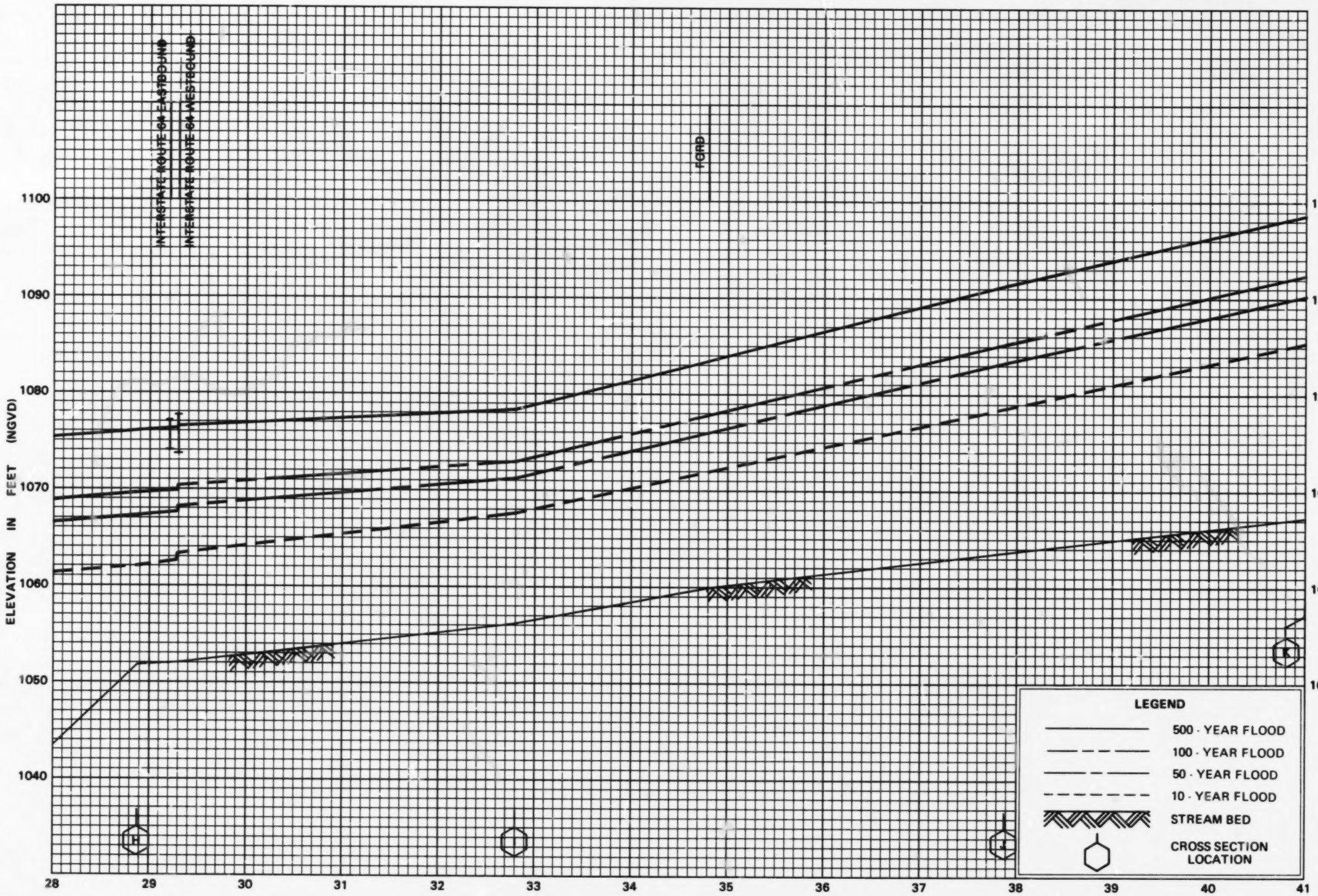

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

03P

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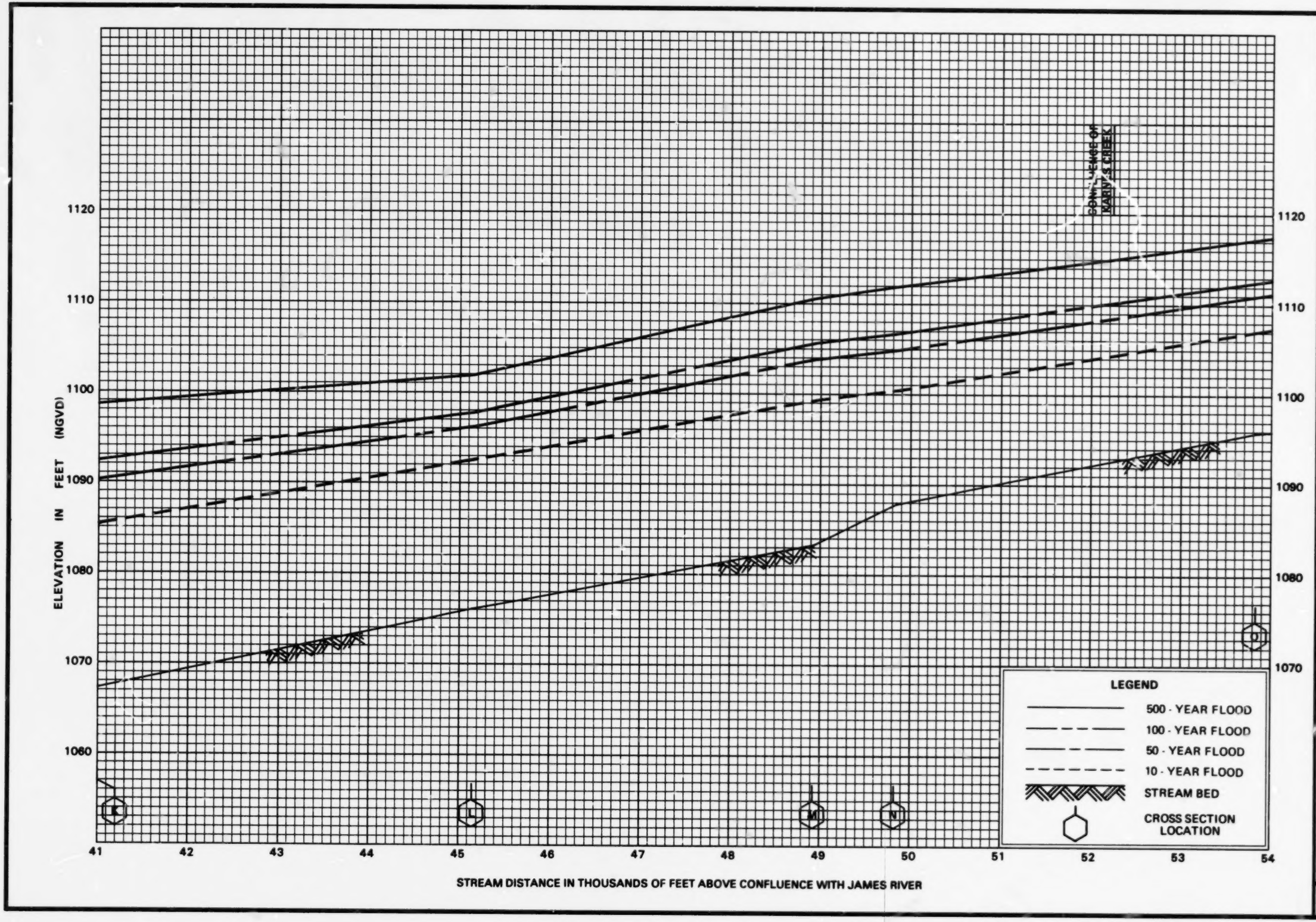

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

04P

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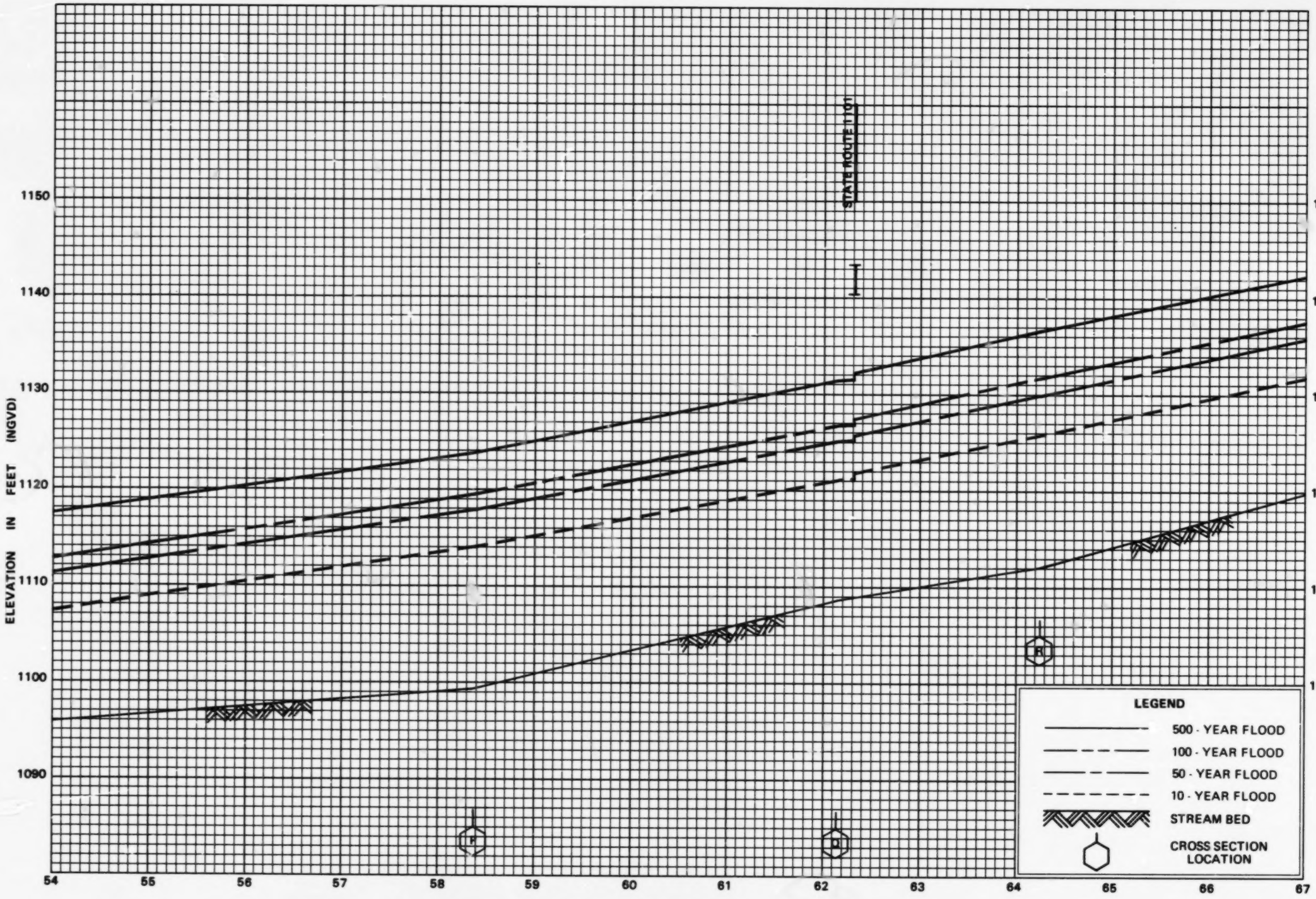

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

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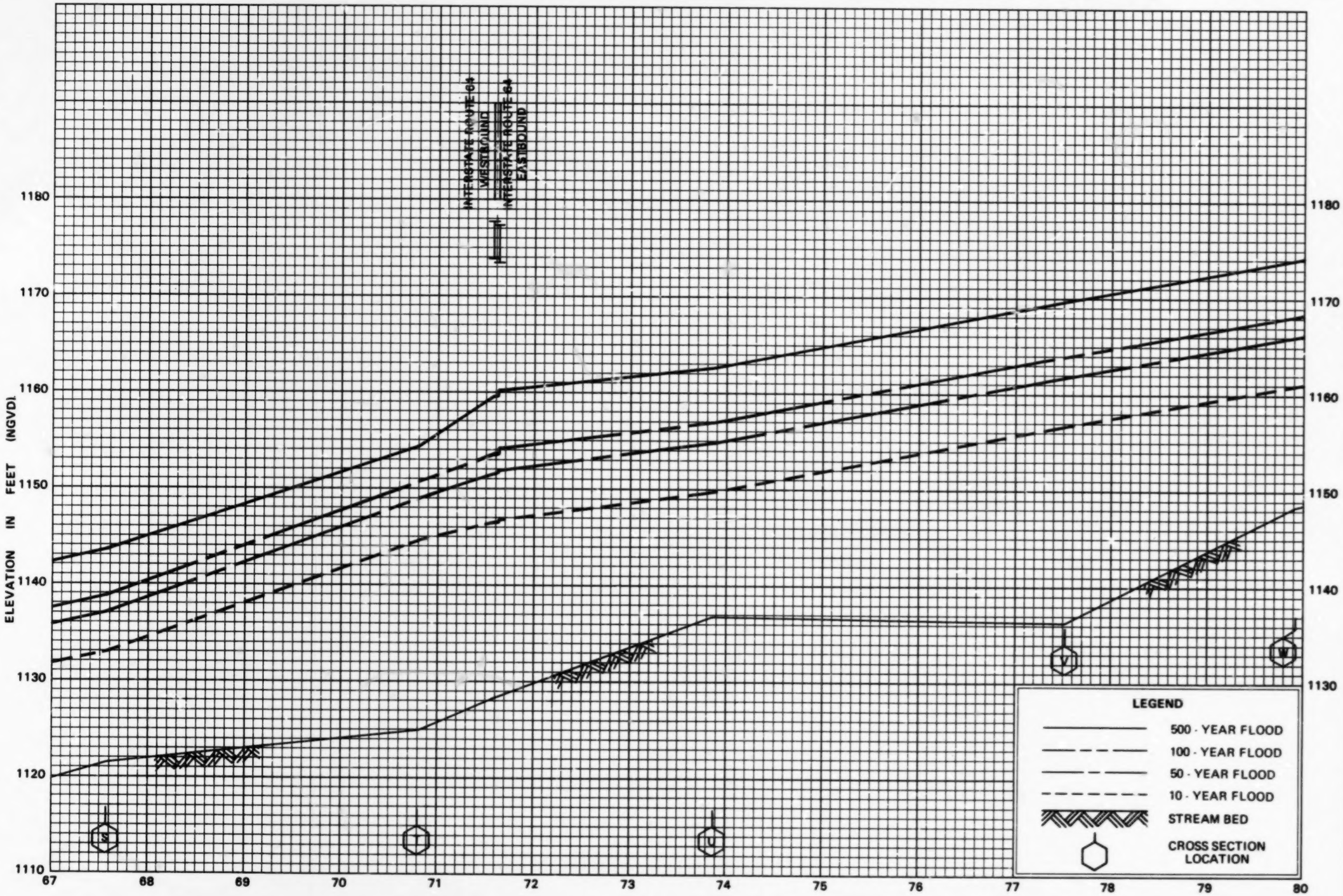

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

06P

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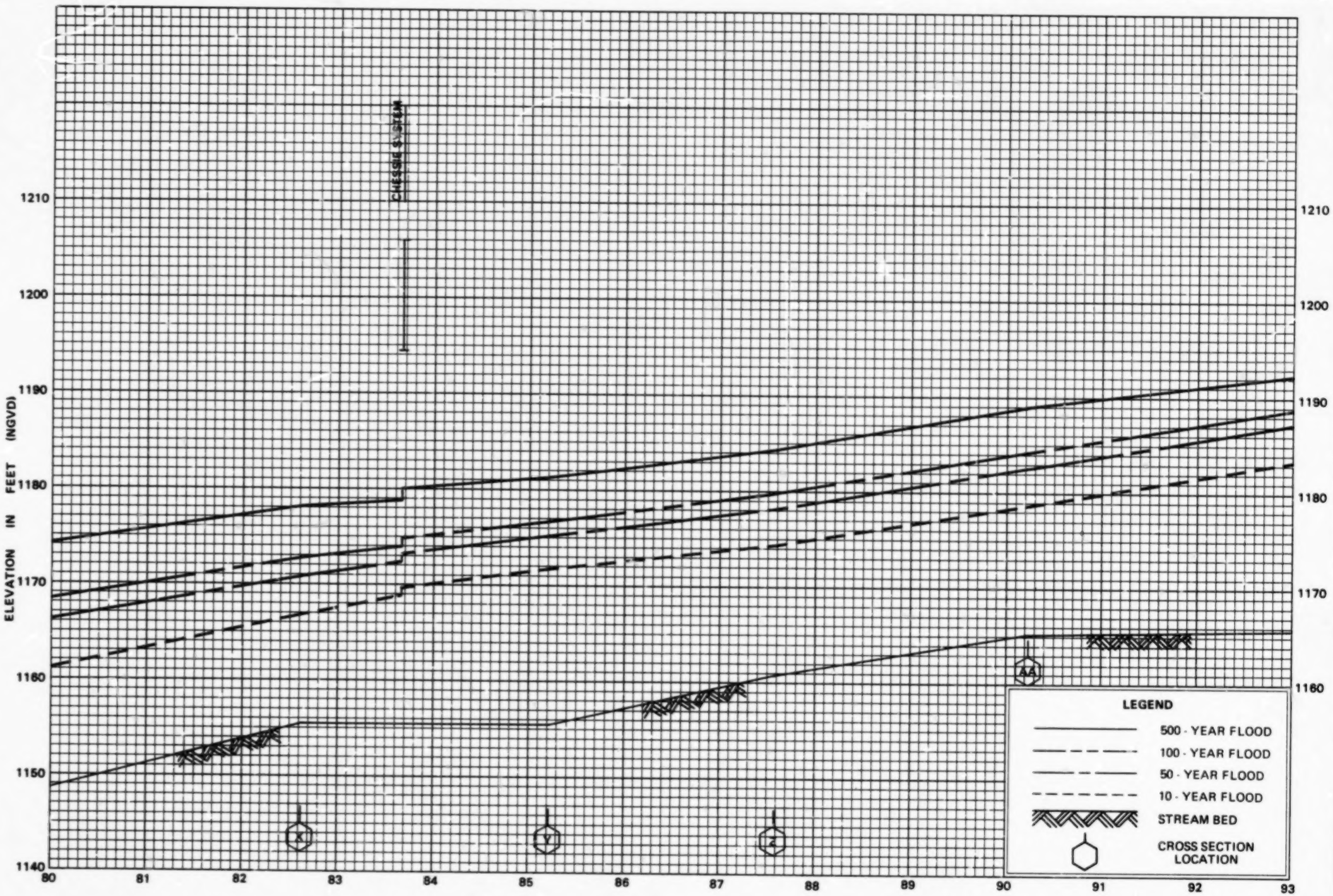

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

07P

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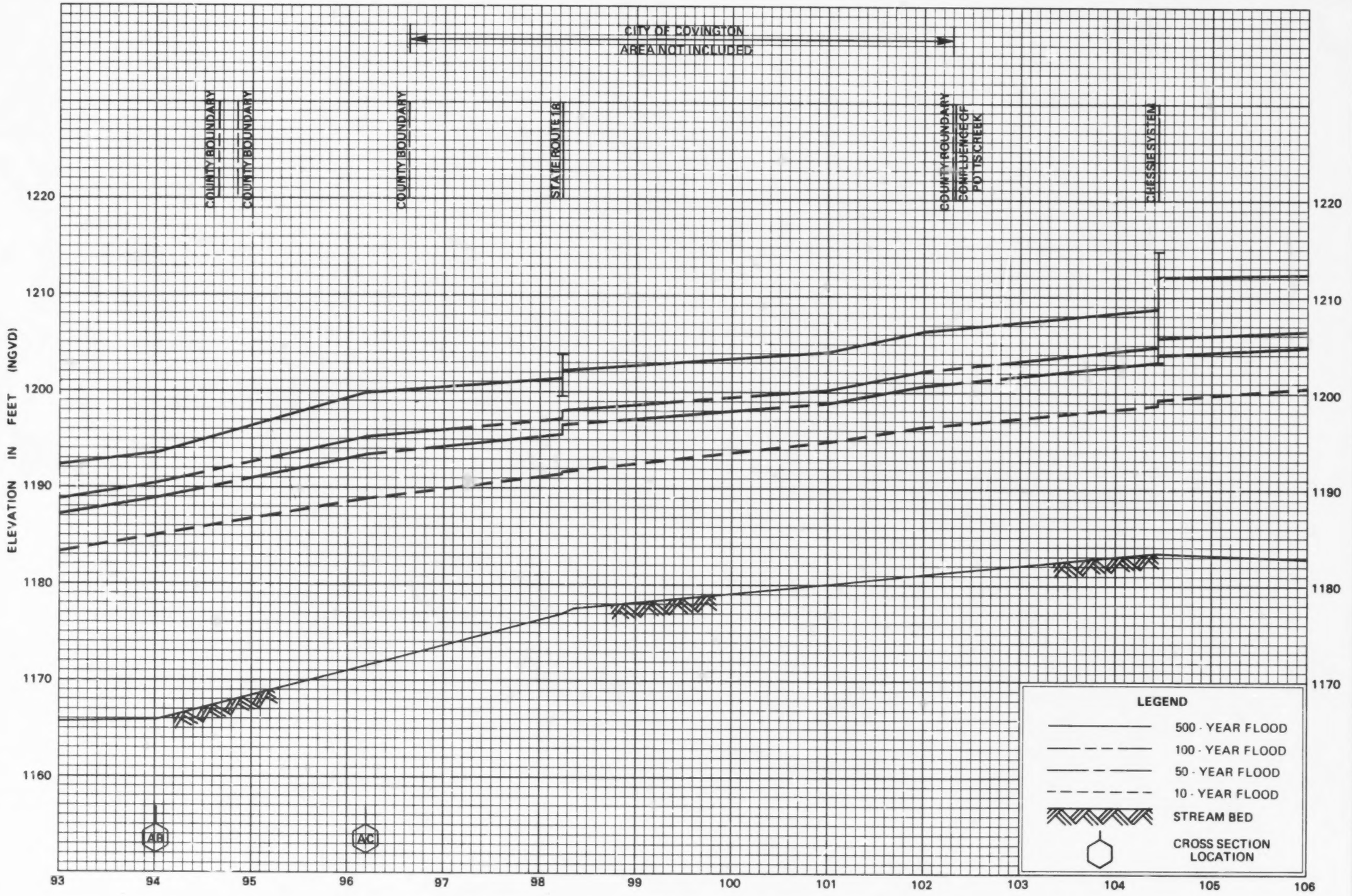

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

08P

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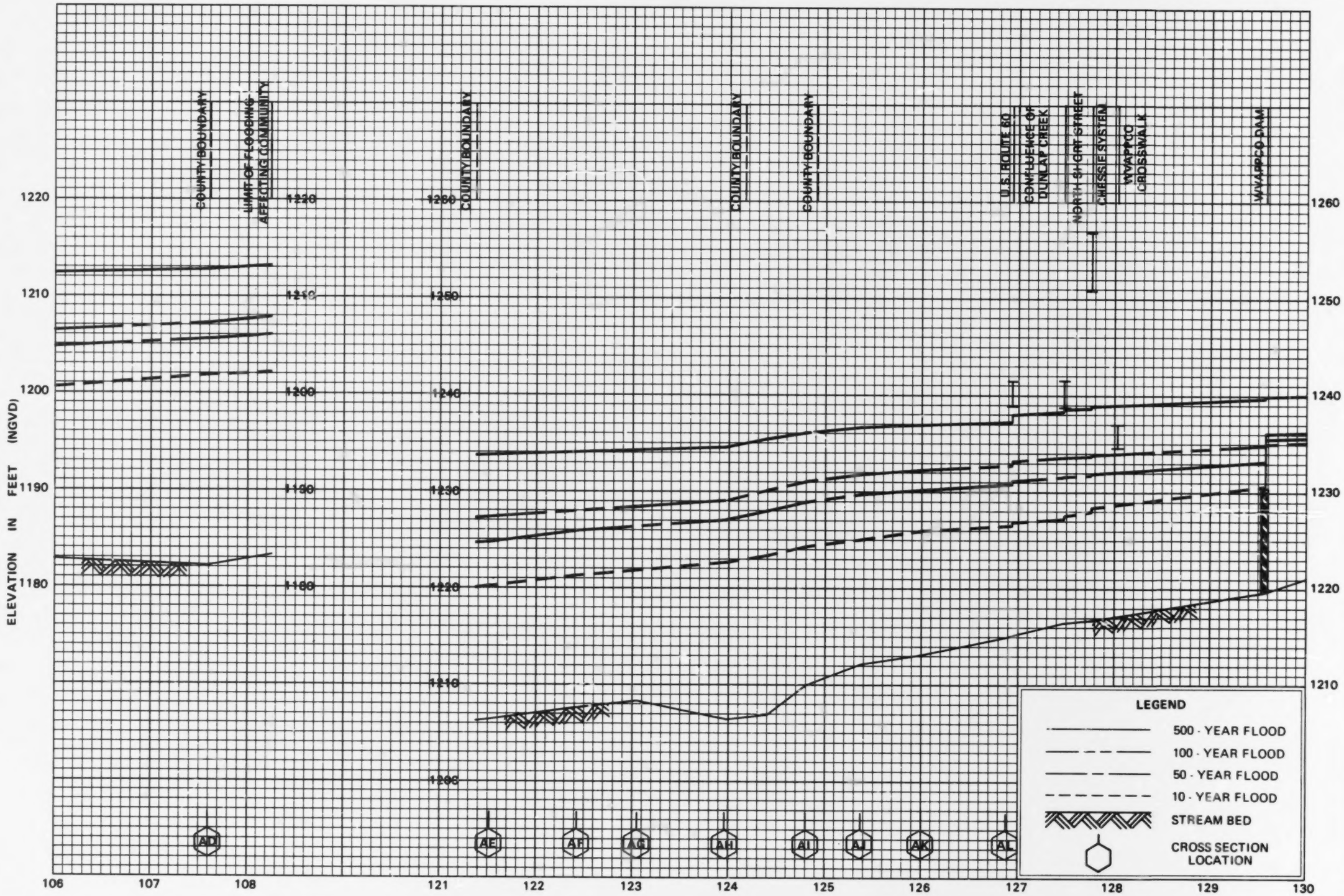

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

09P

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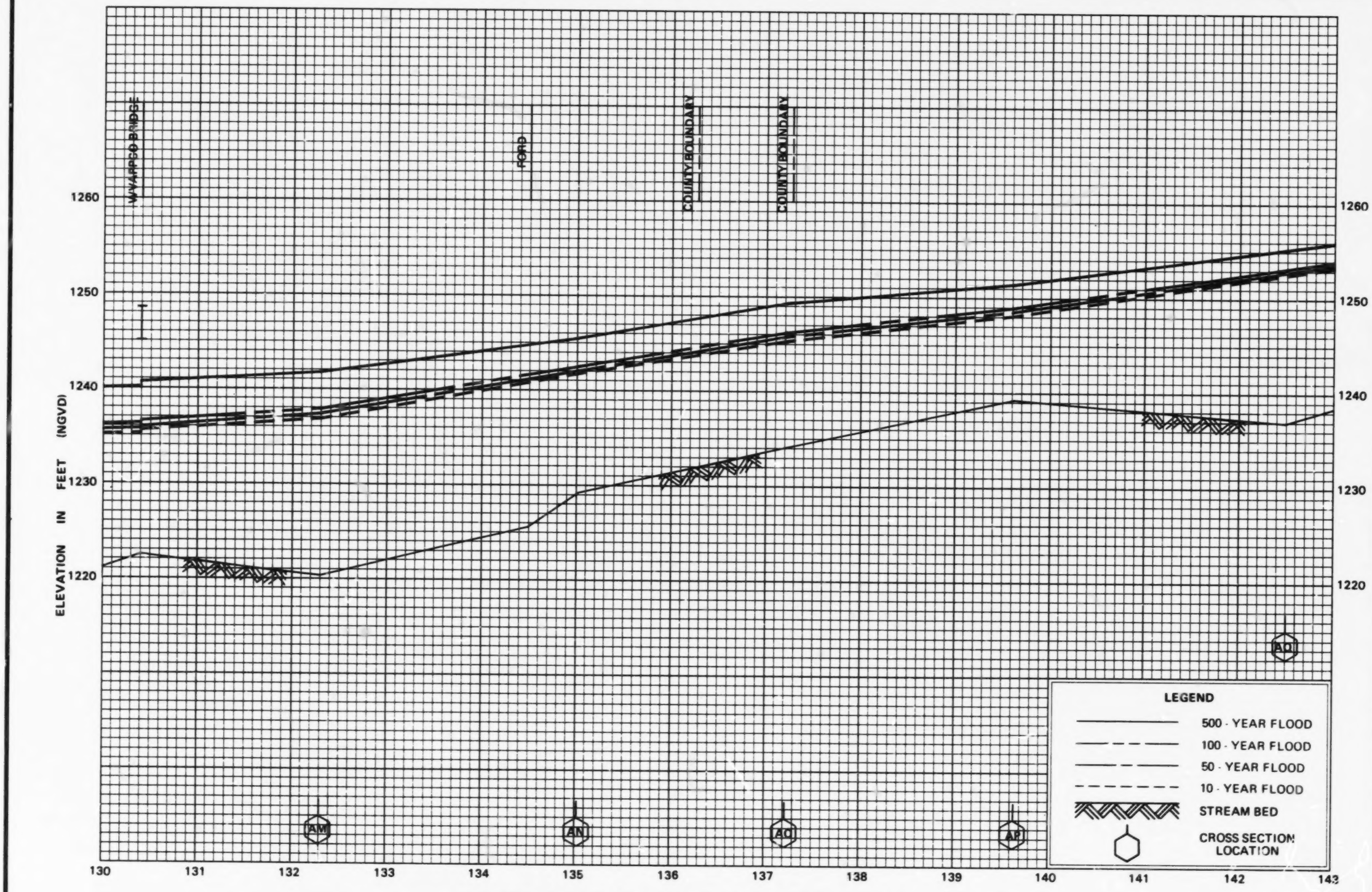

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

10P

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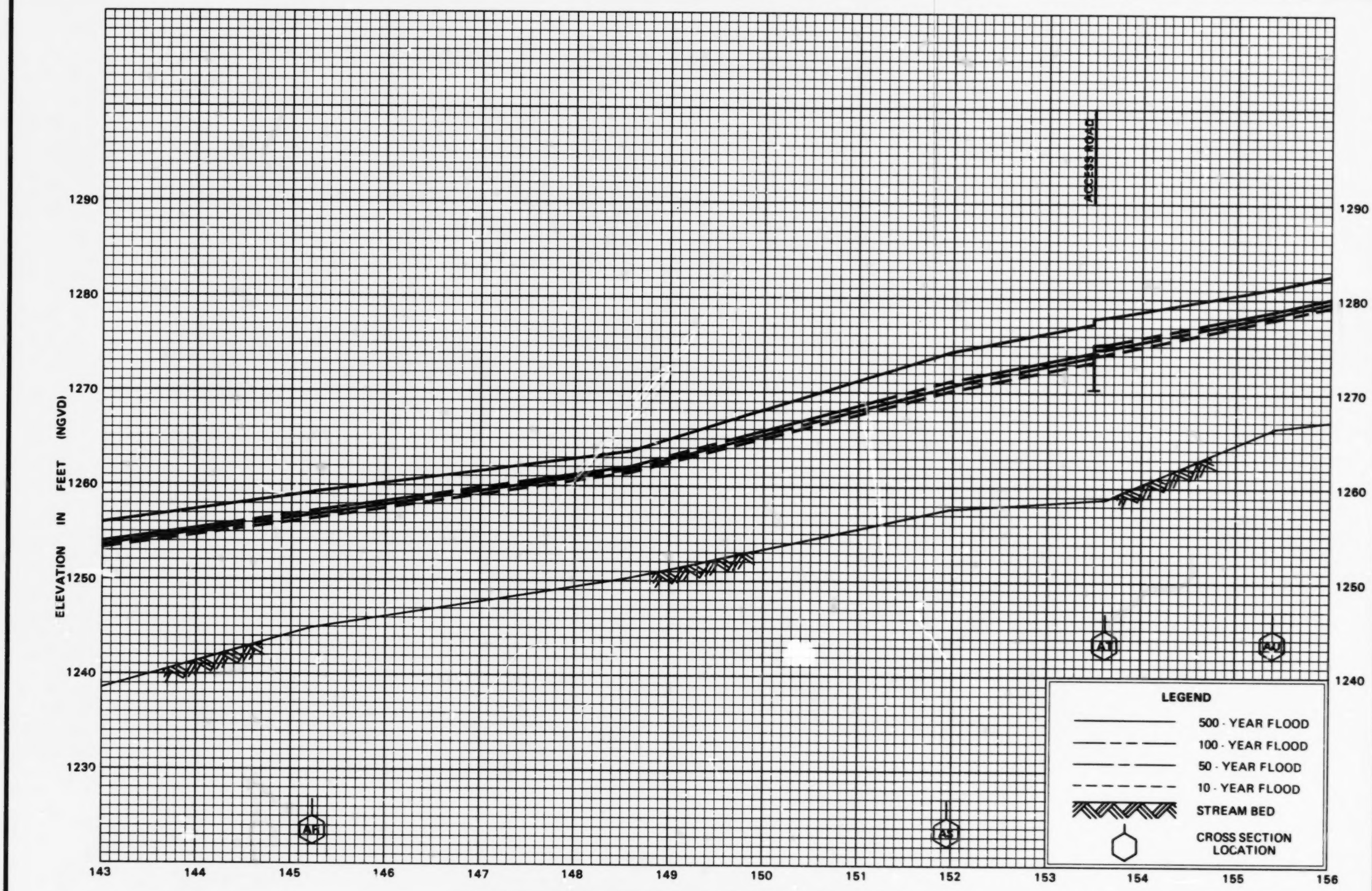

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

11P

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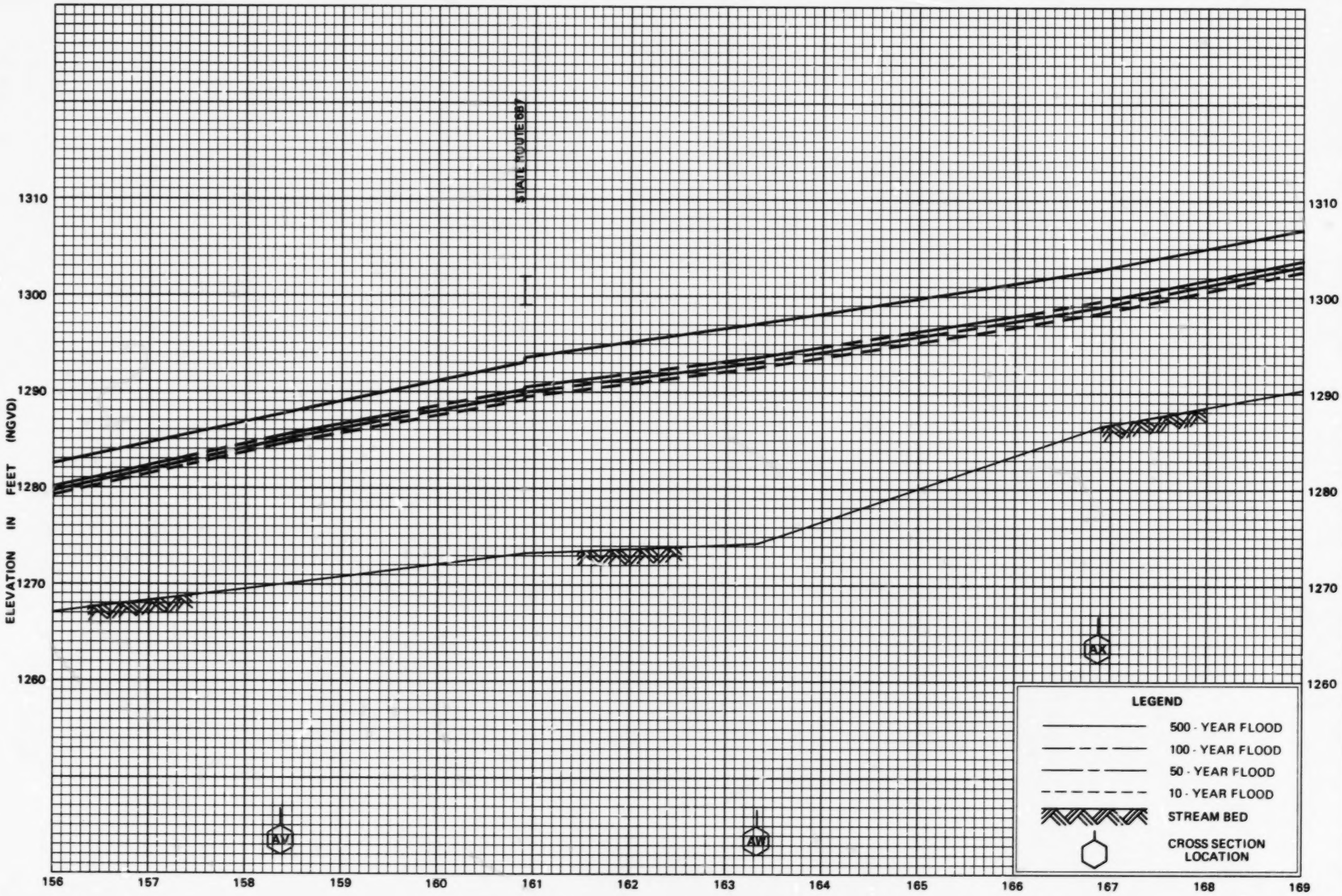

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

12P

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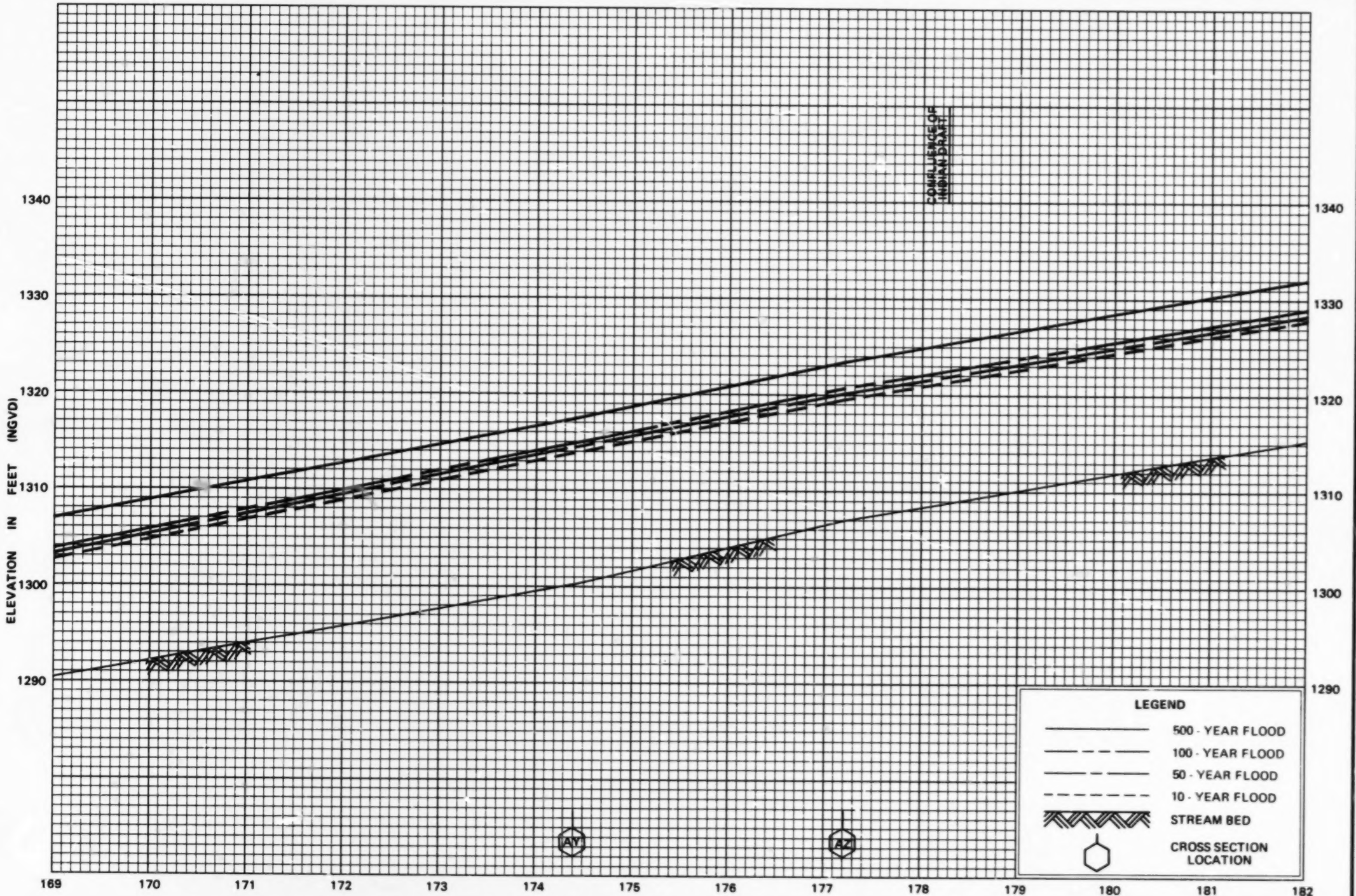

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

13P

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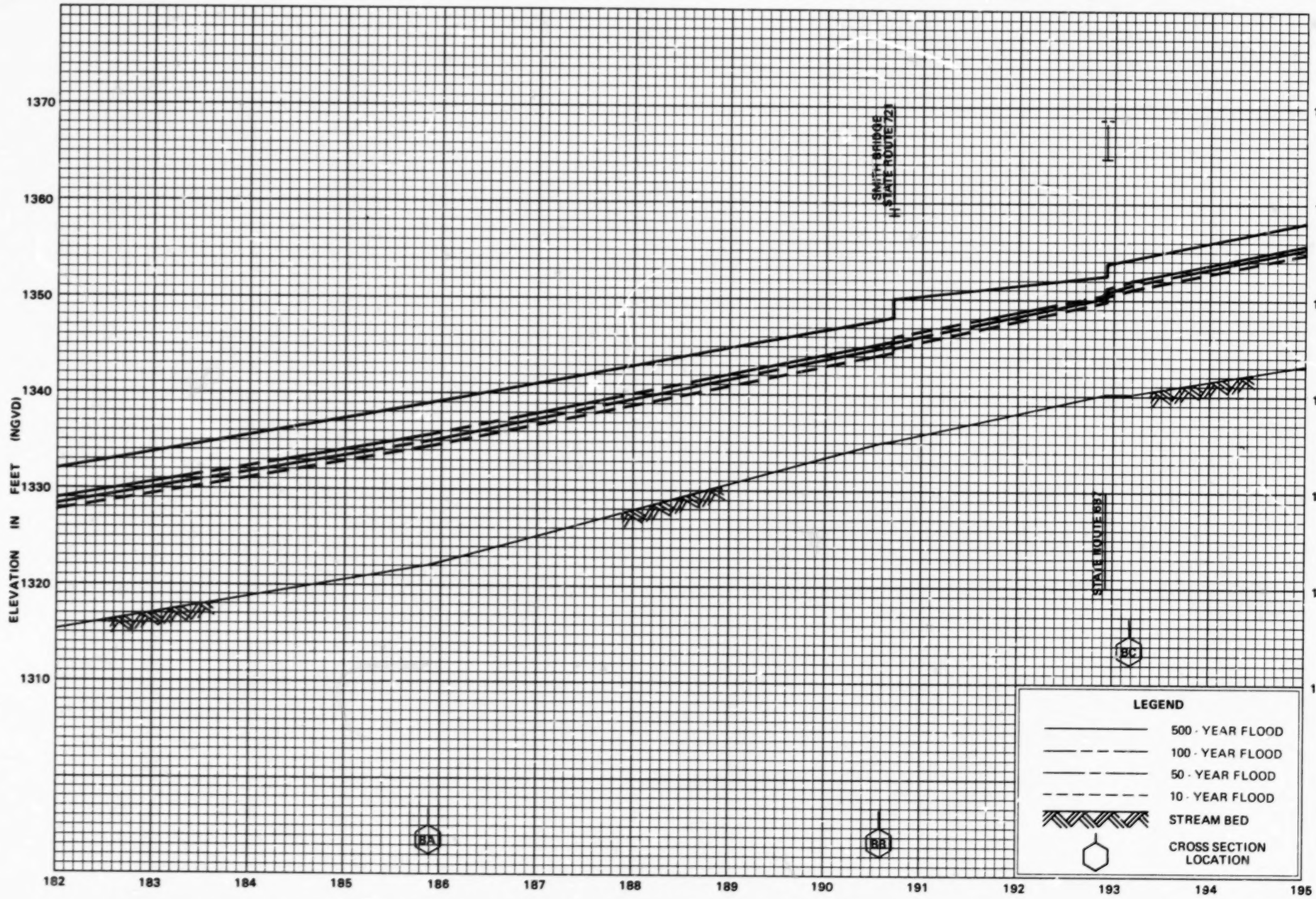

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

14P

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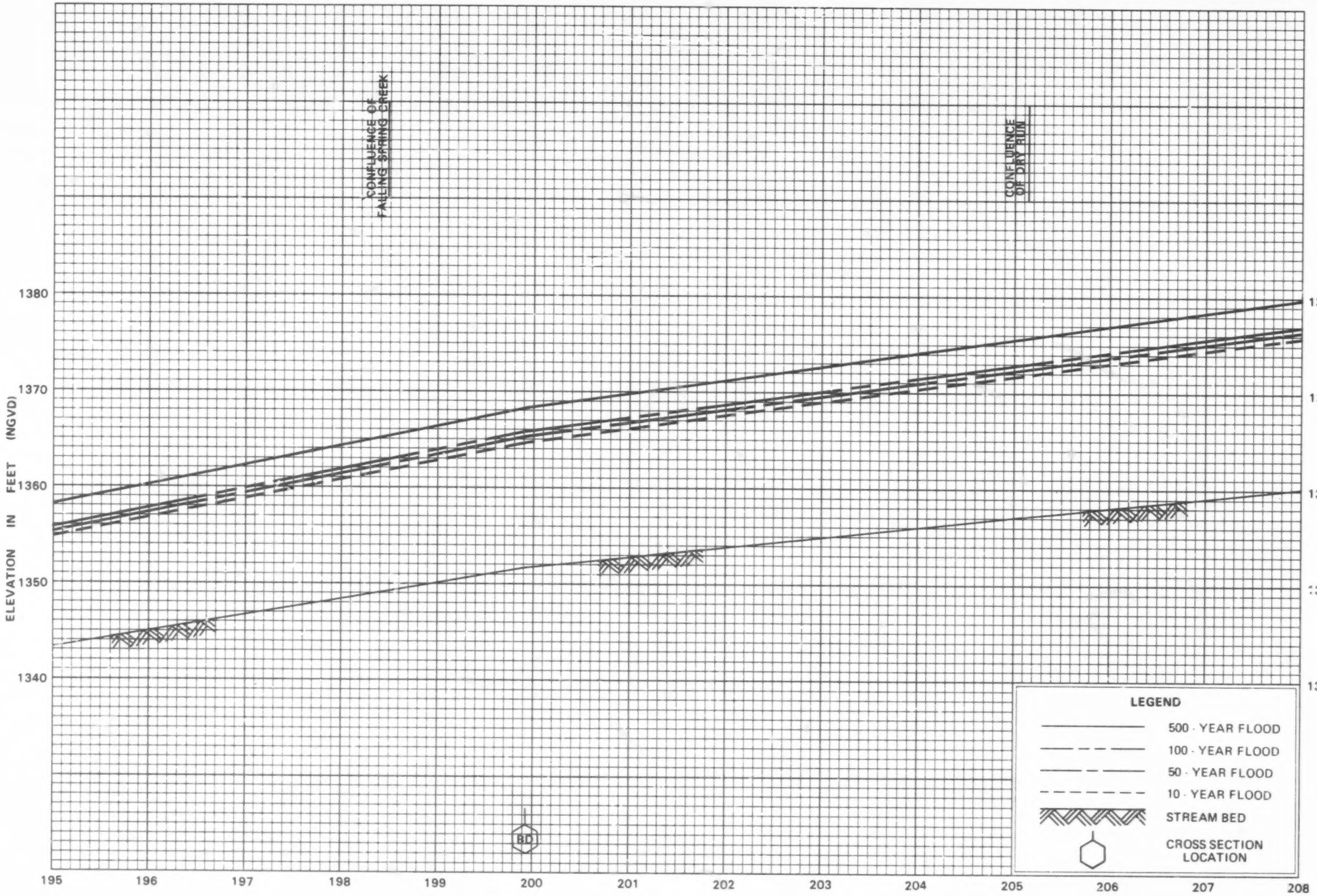

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

15P

J.L

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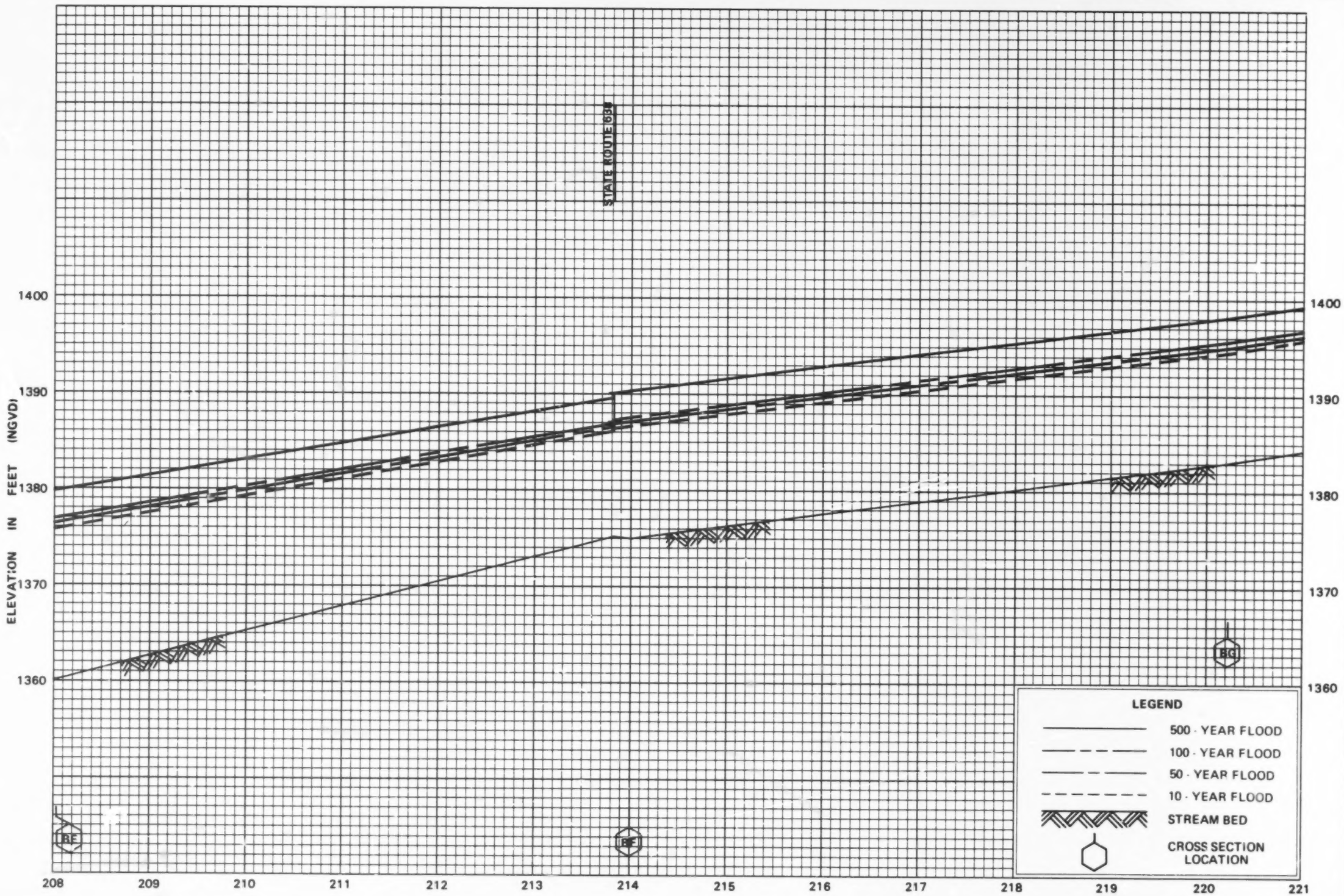

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

16P

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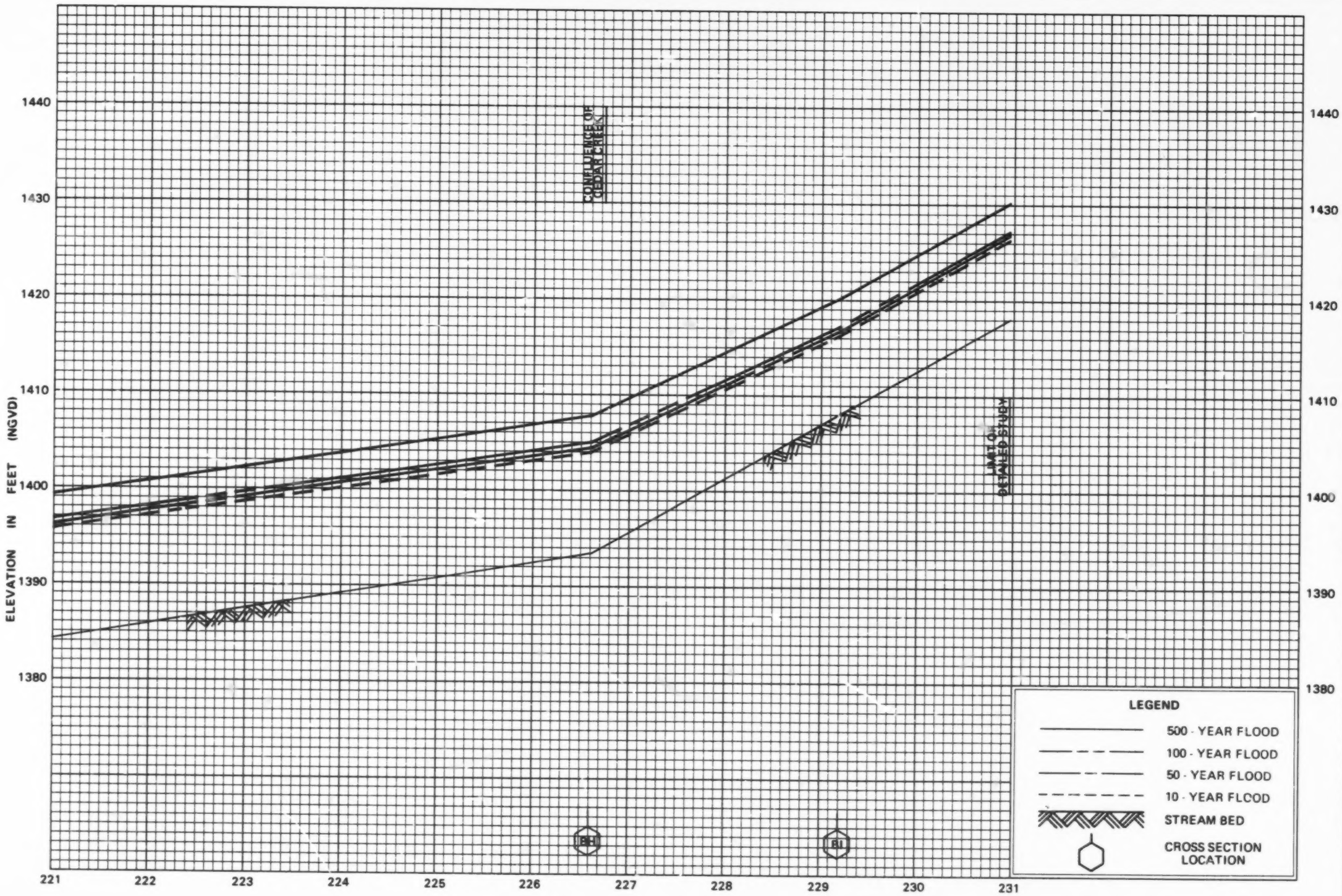

FLOOD PROFILES

JACKSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

17P

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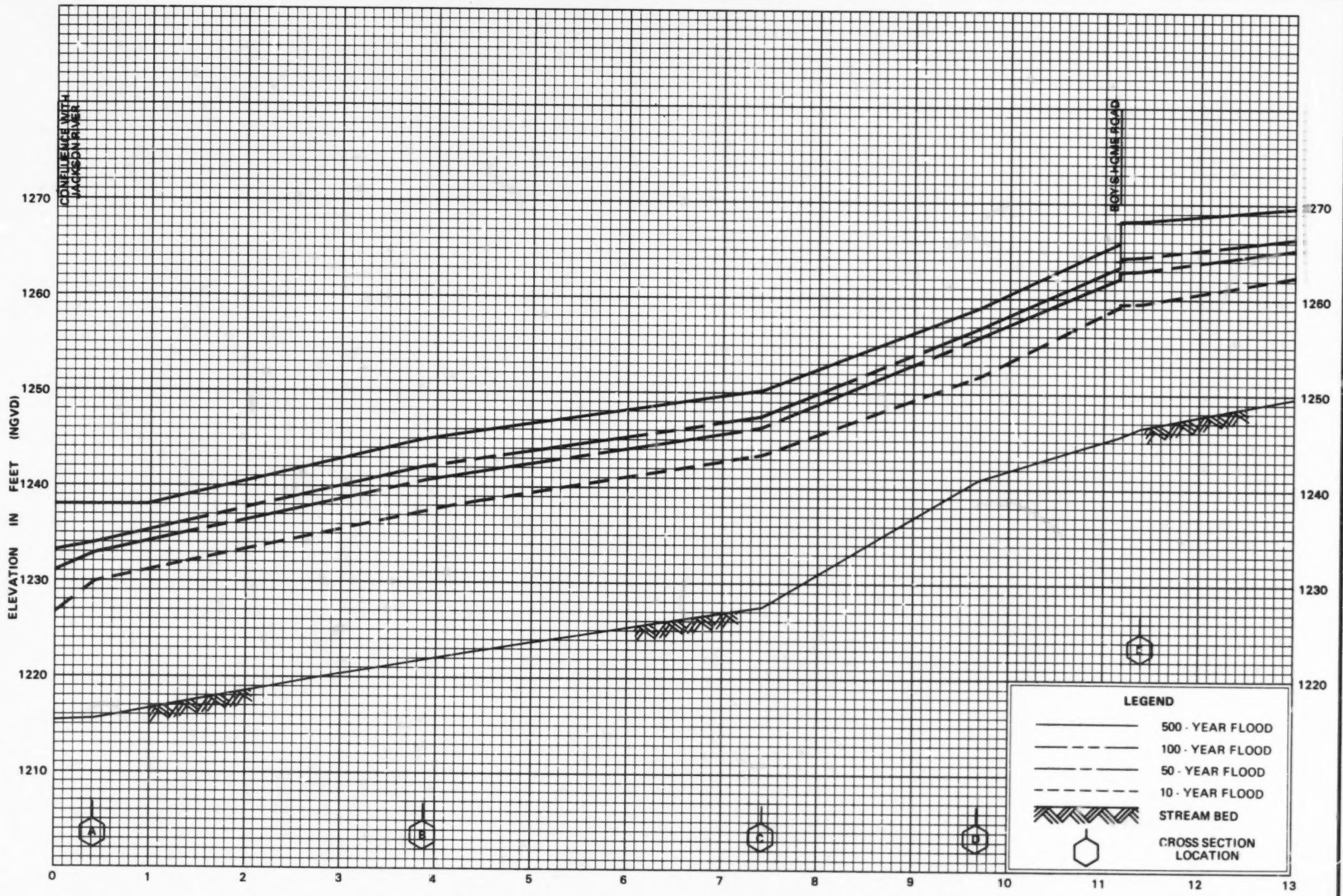

FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

18P

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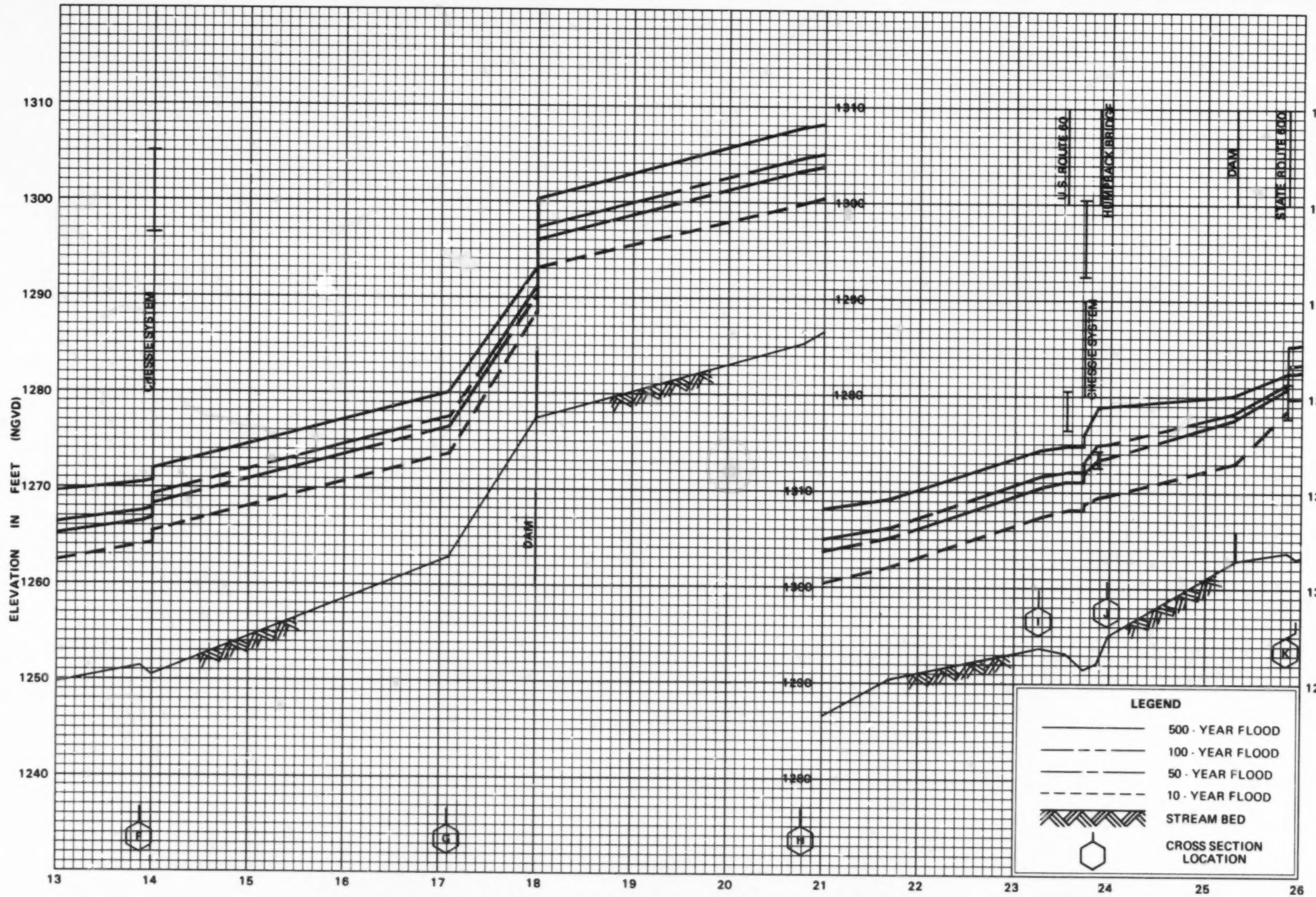

FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

19P

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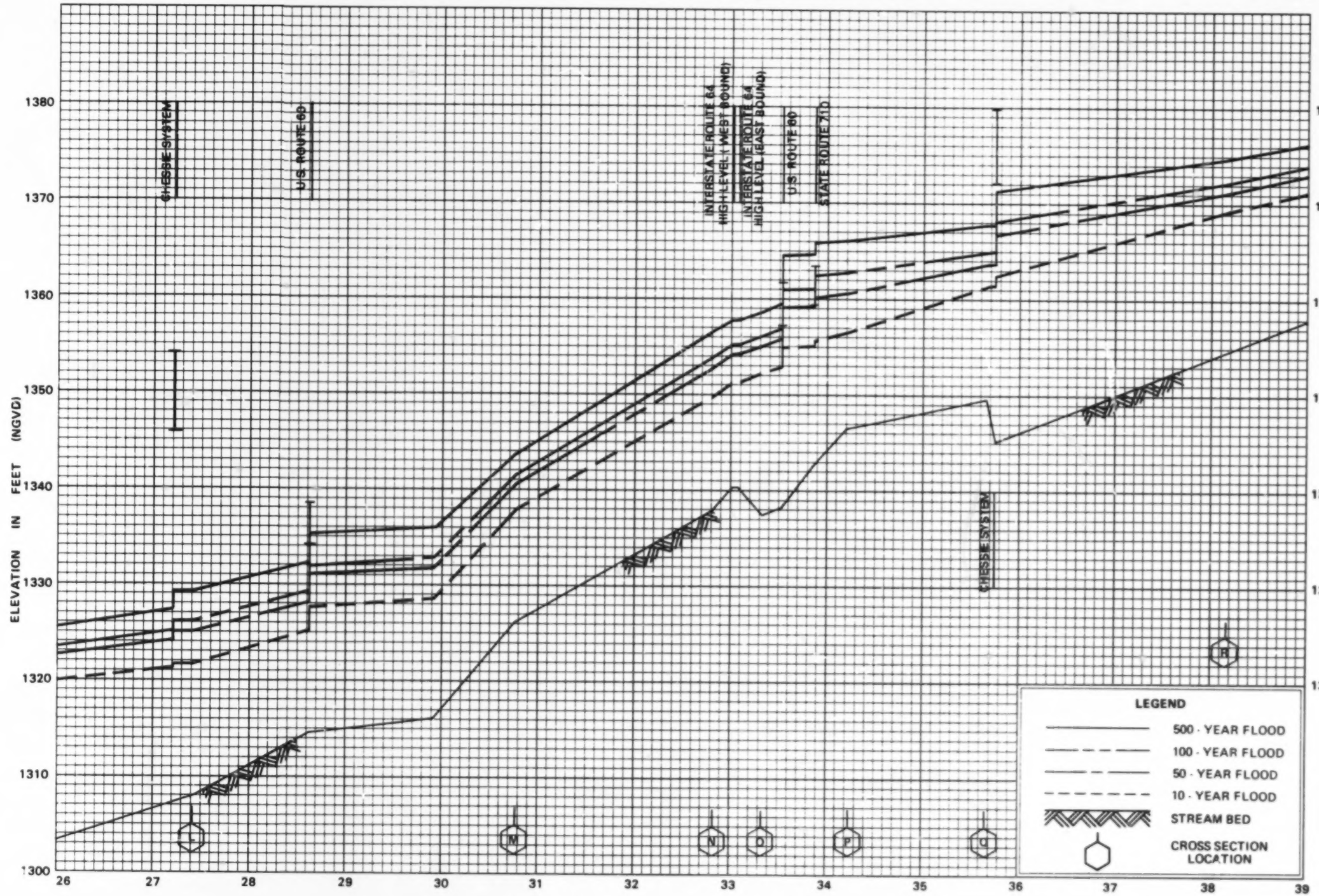

FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

20P

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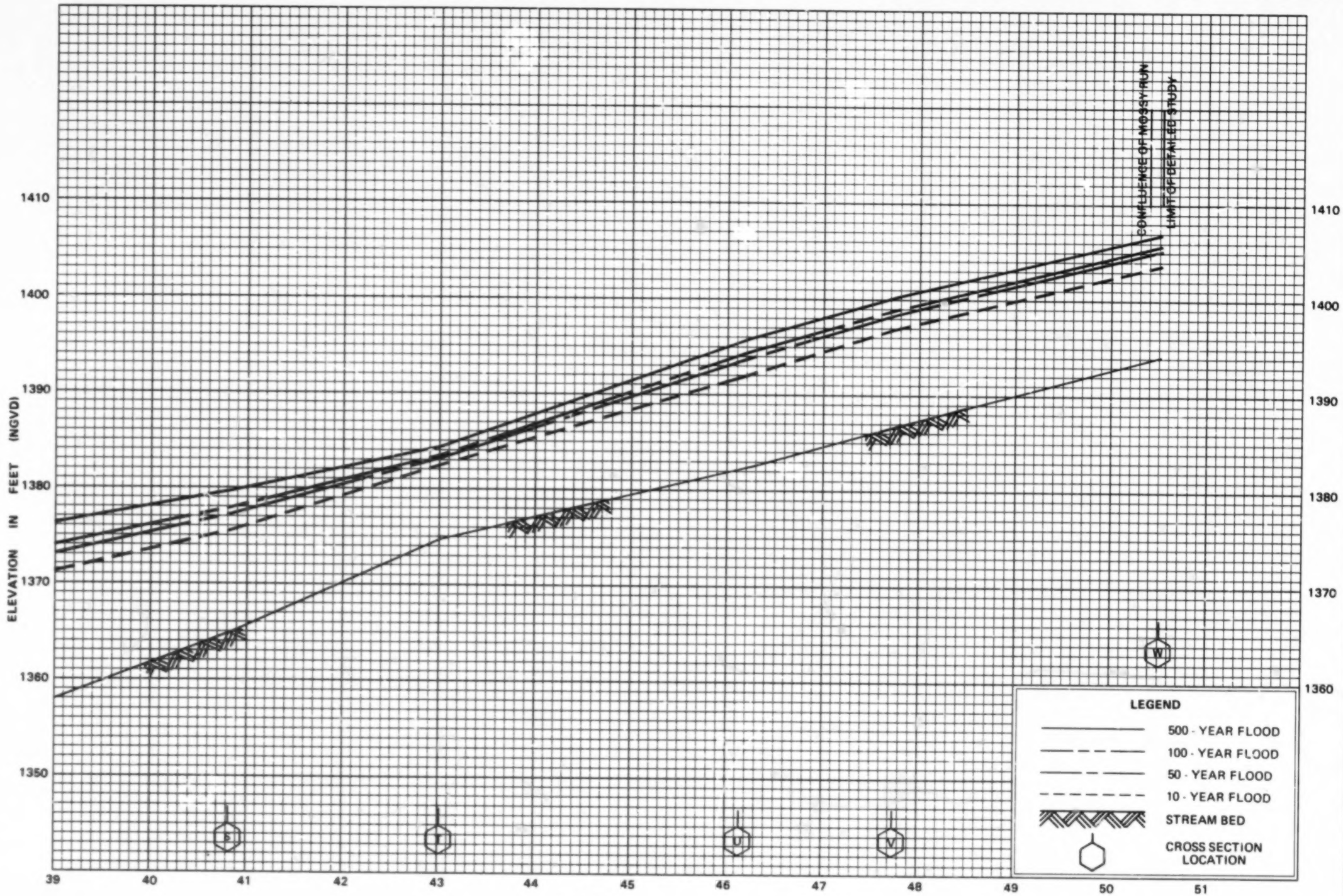

FLOOD PROFILES

DUNLAP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

21P

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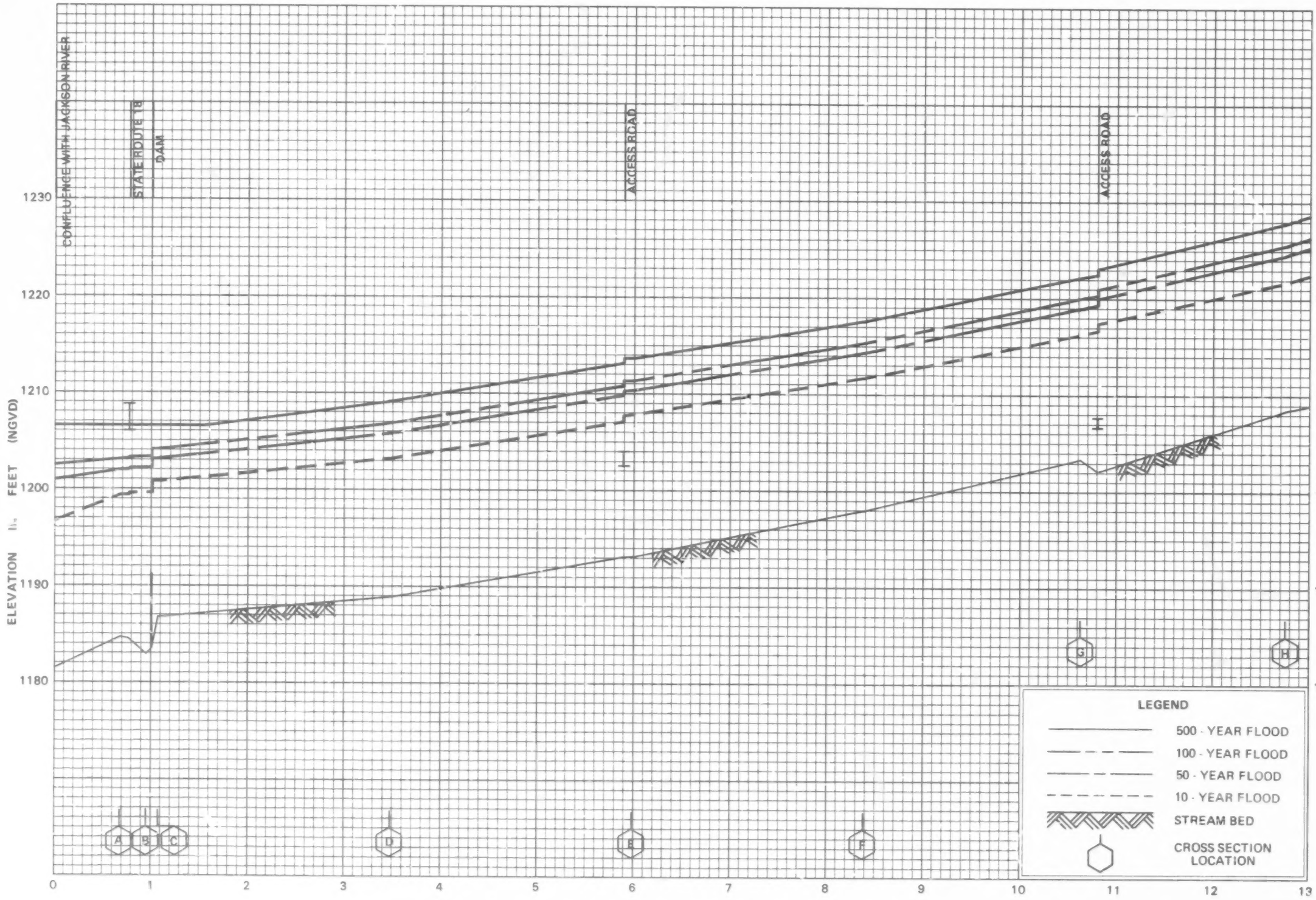

FLOOD PROFILES

POTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

22P

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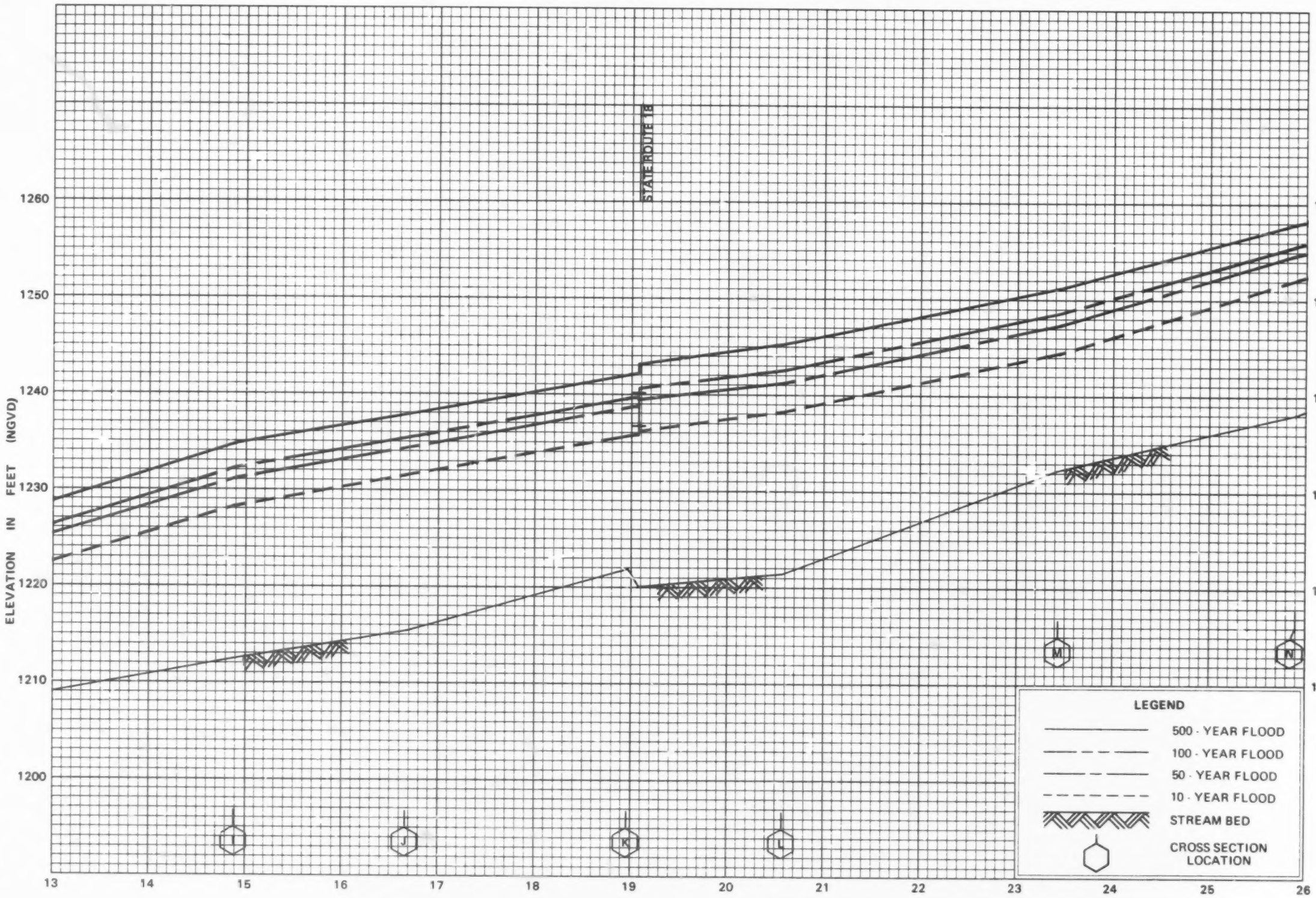

FLOOD PROFILES

POTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

23P

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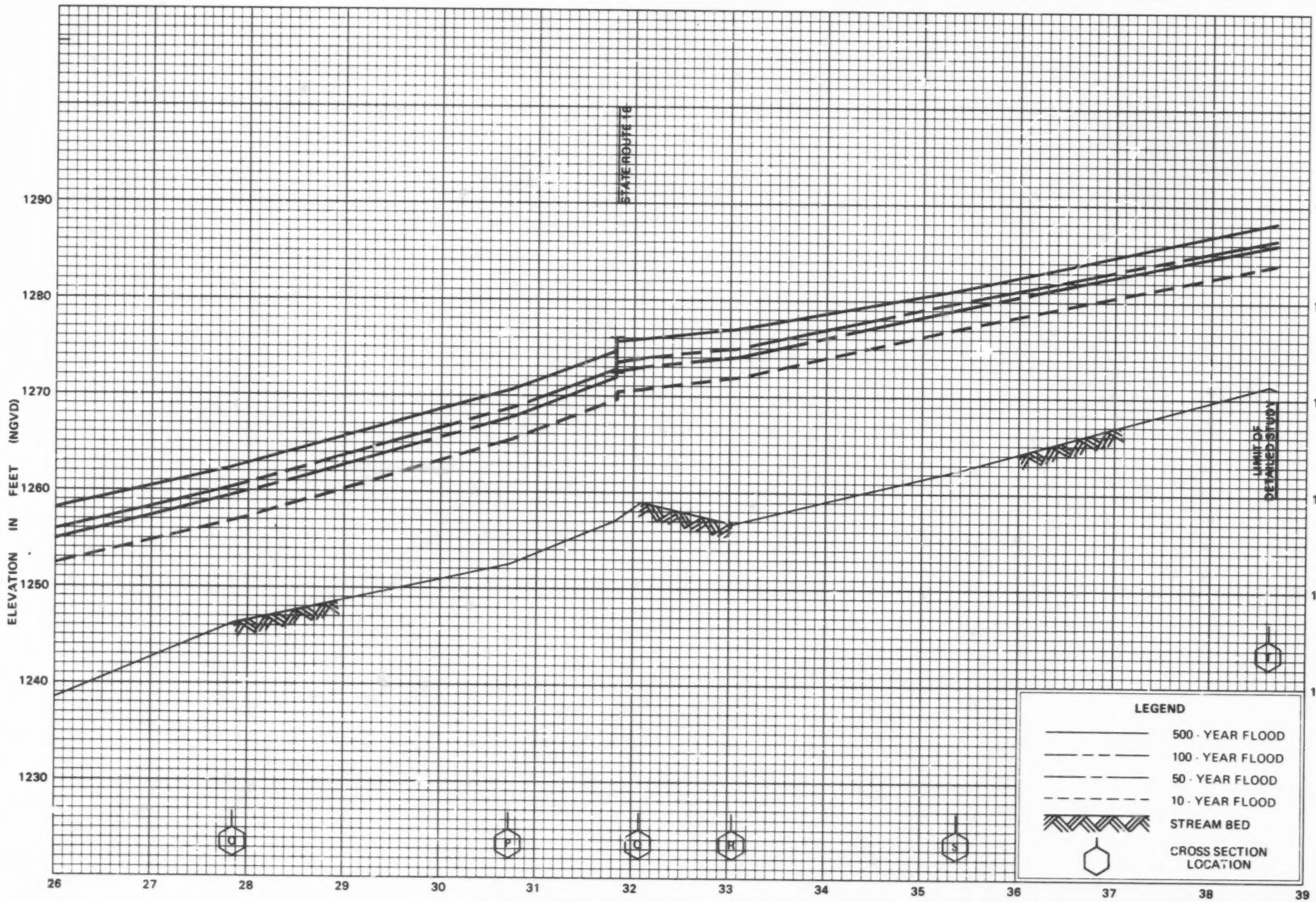

FLOOD PROFILES

POTTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

24P

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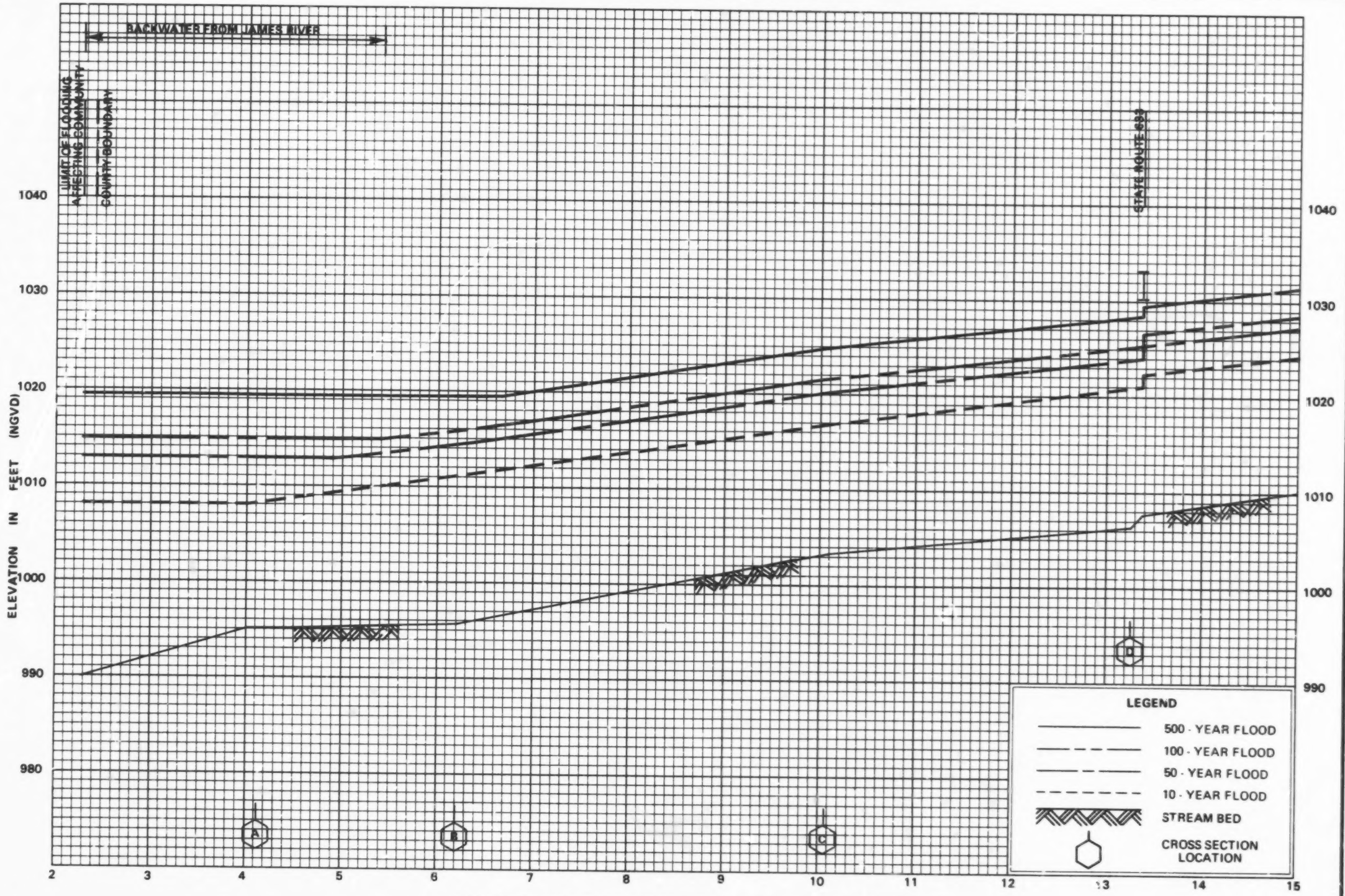

FLOOD PROFILES

COWPASTURE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

25P

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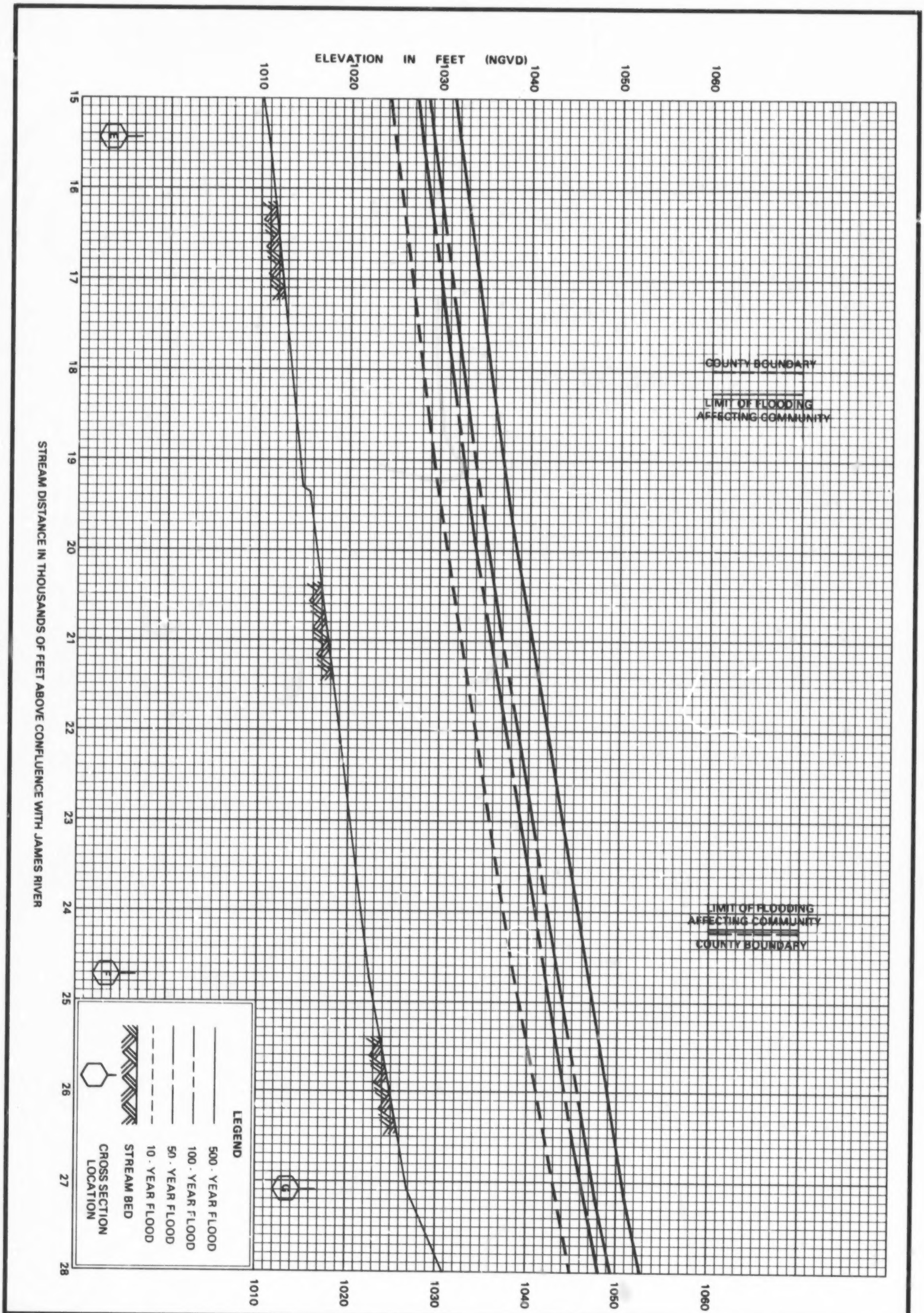

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

FLOOD PROFILES

COWPASTURE RIVER

26P

55

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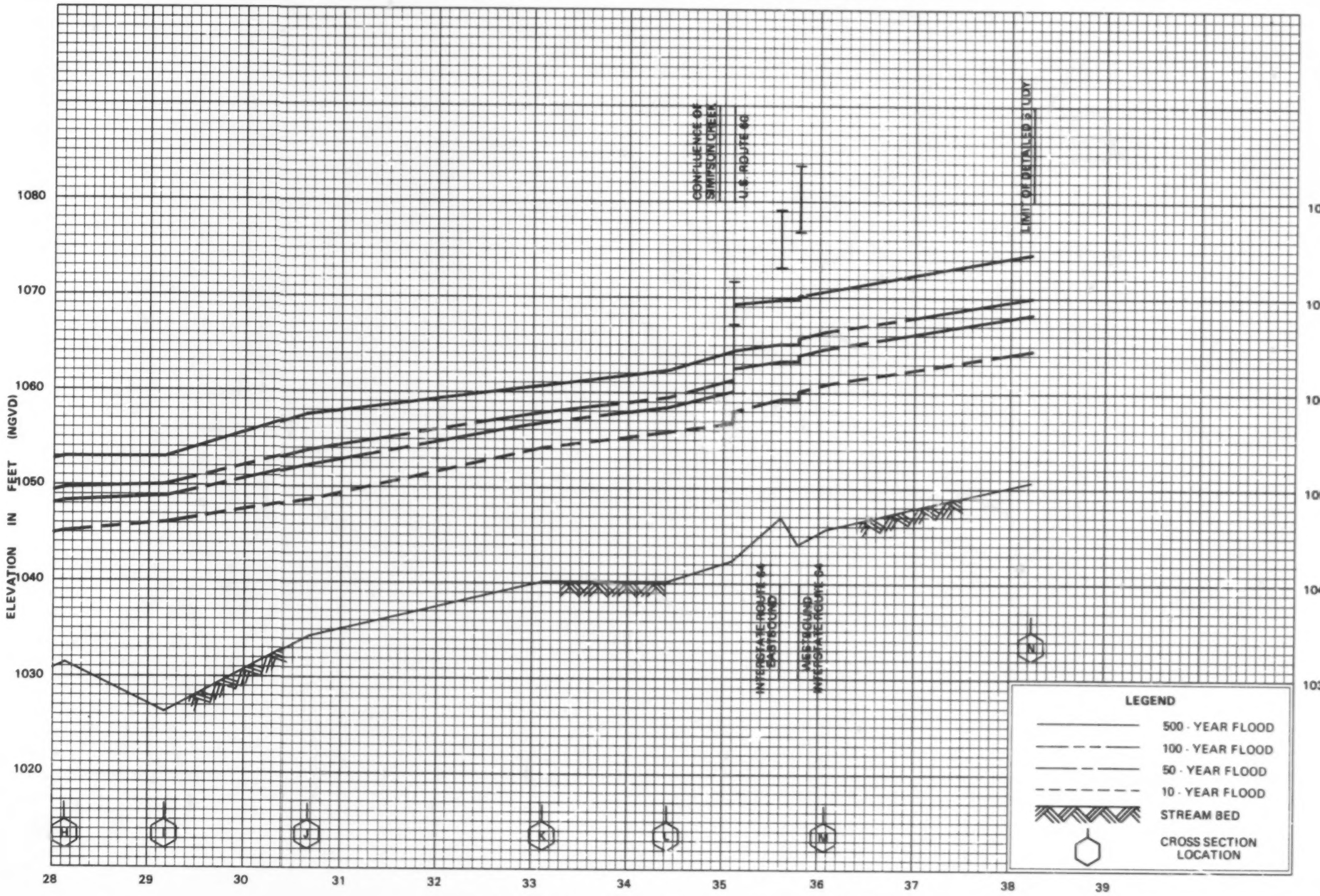

FLOOD PROFILES

COWPASTURE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

27P

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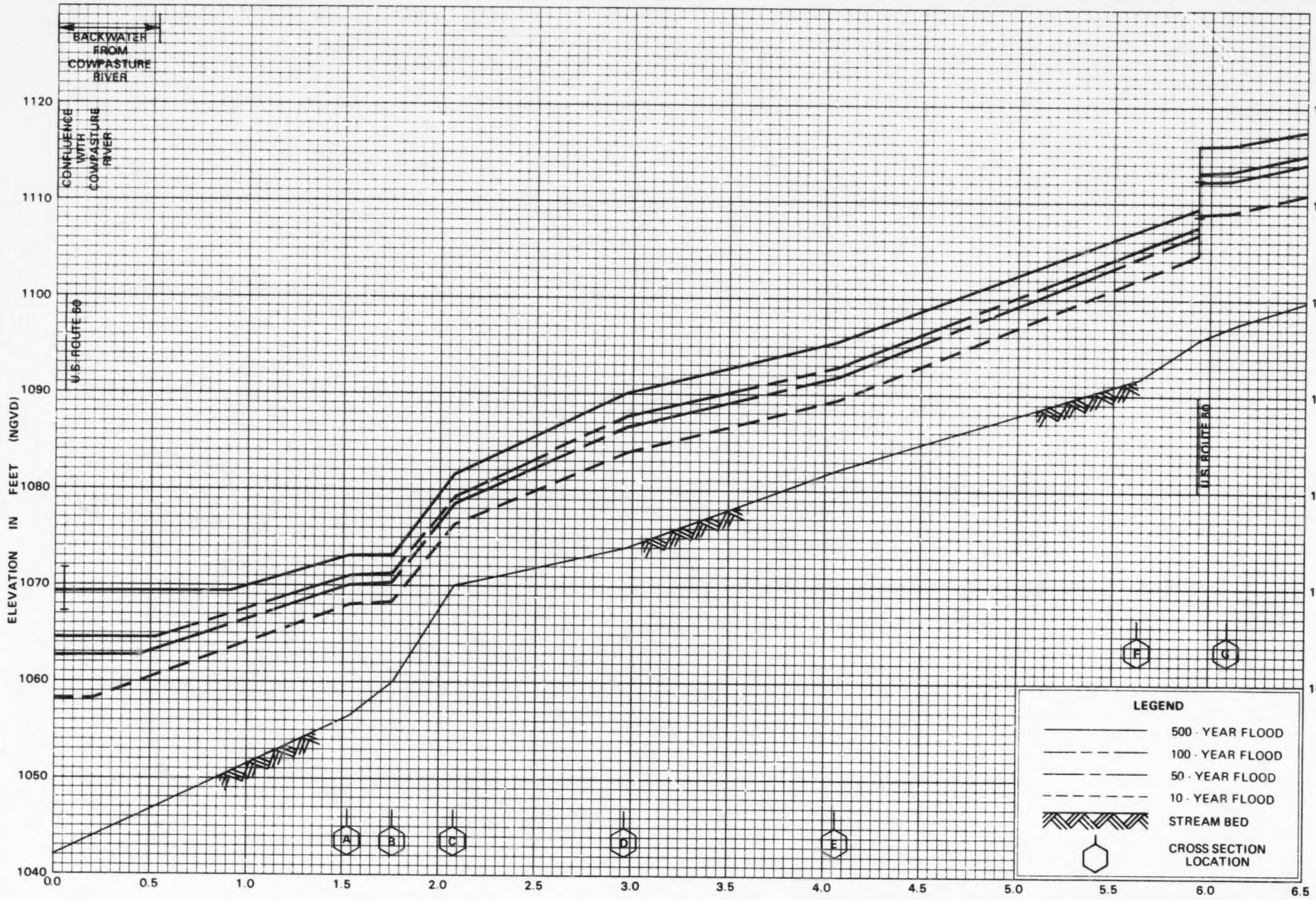

FLOOD PROFILES

SIMPSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

28P

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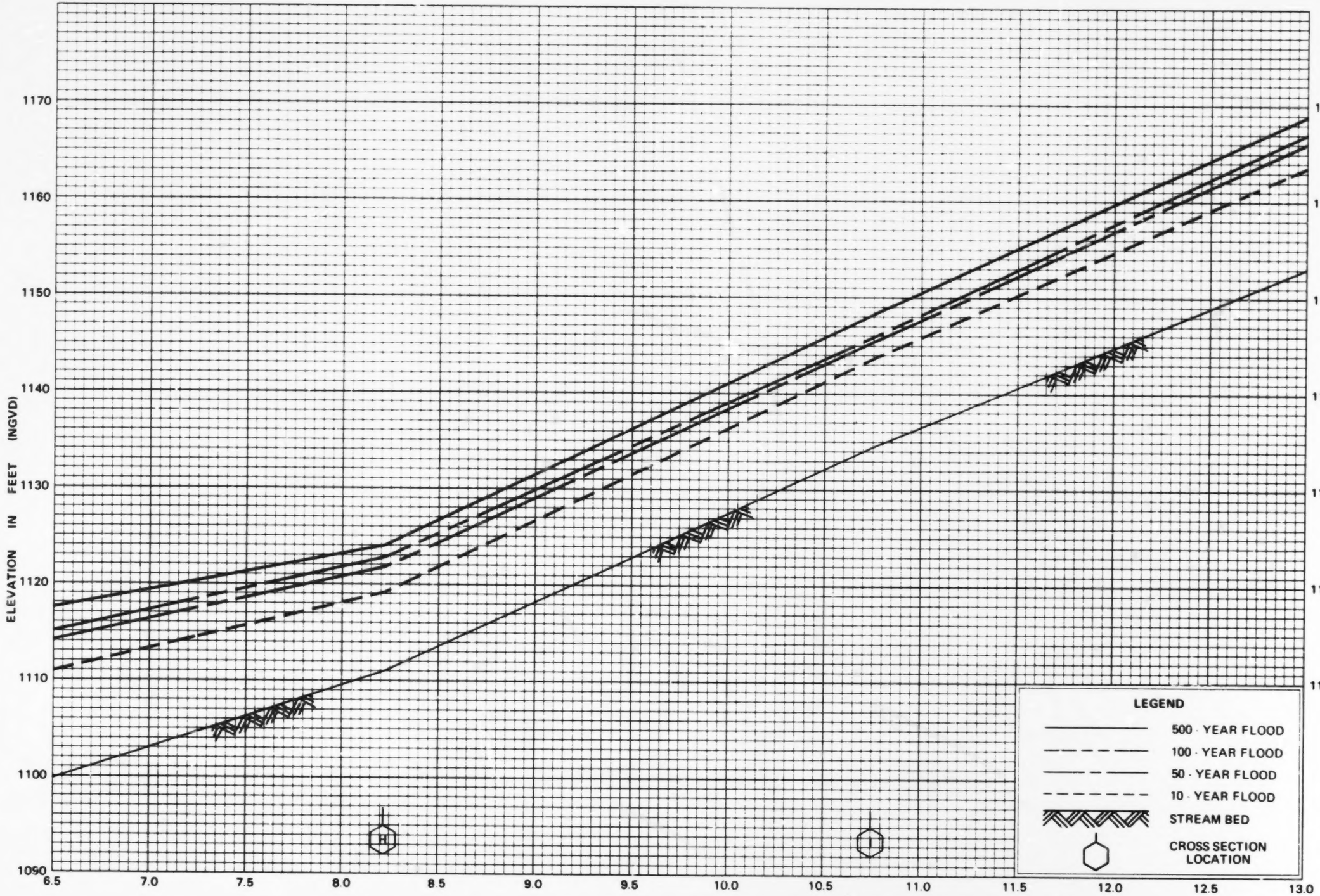

FLOOD PROFILES

SIMPSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

29P

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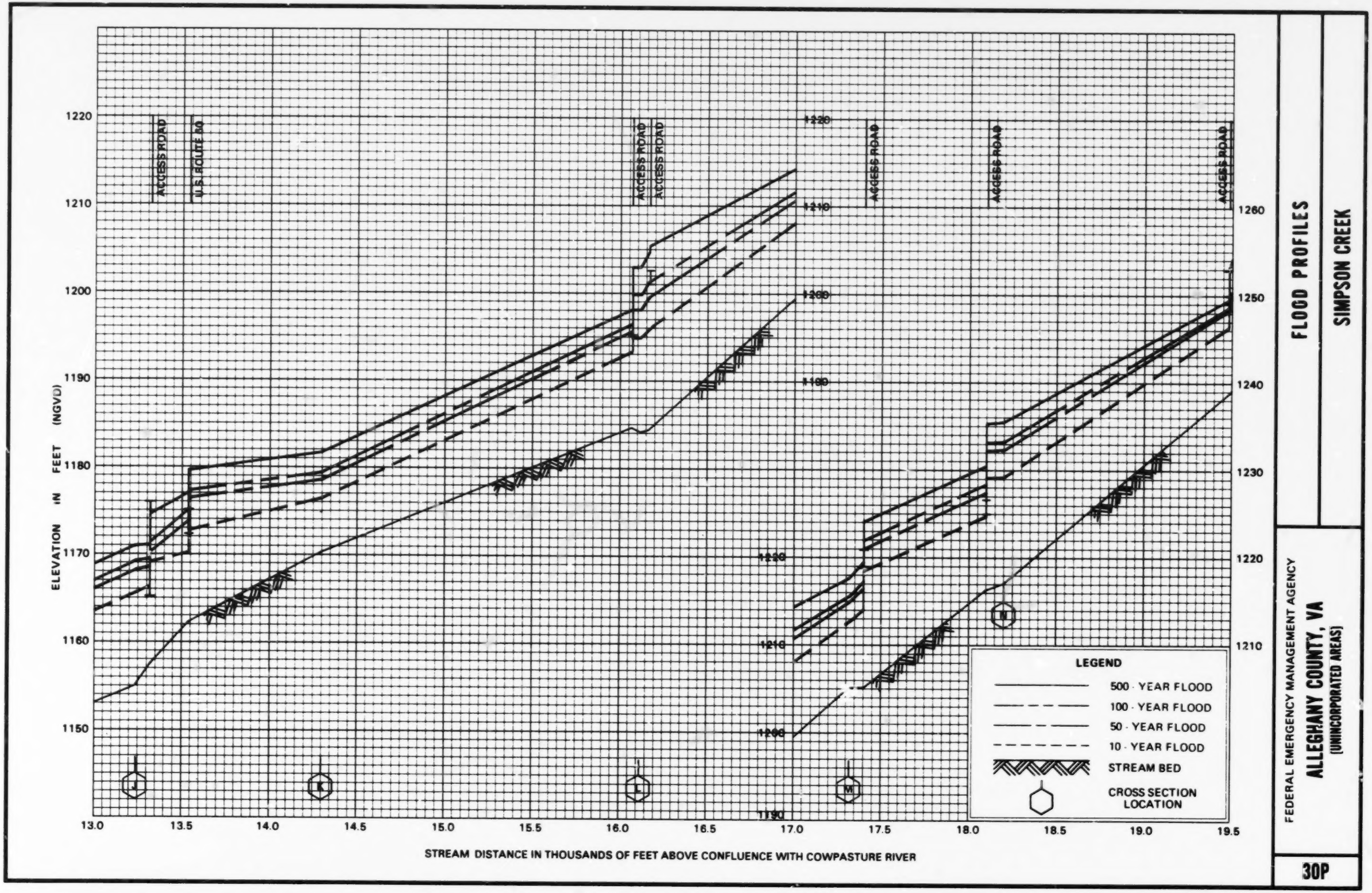

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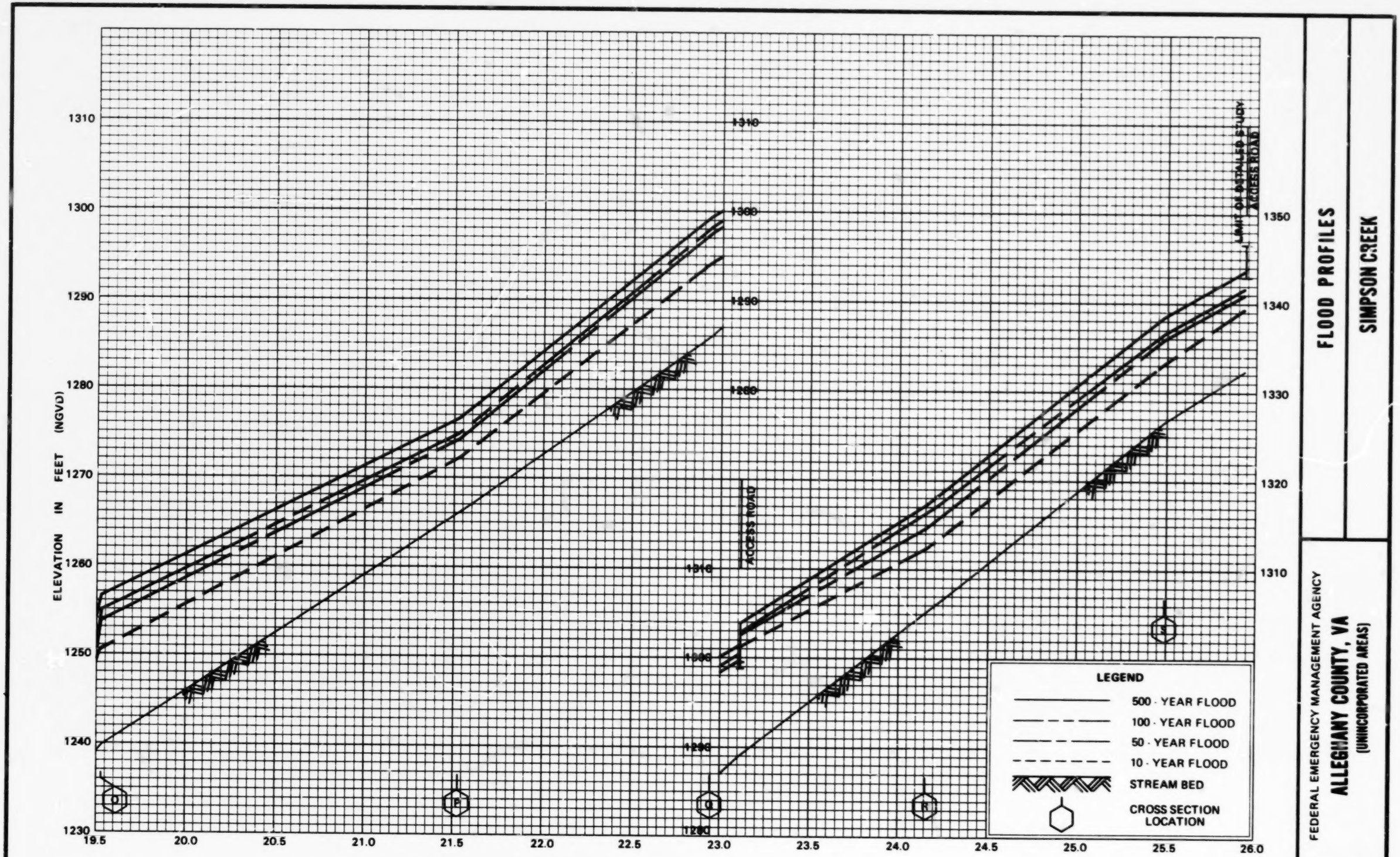

FLOOD PROFILES

SIMPSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

31P

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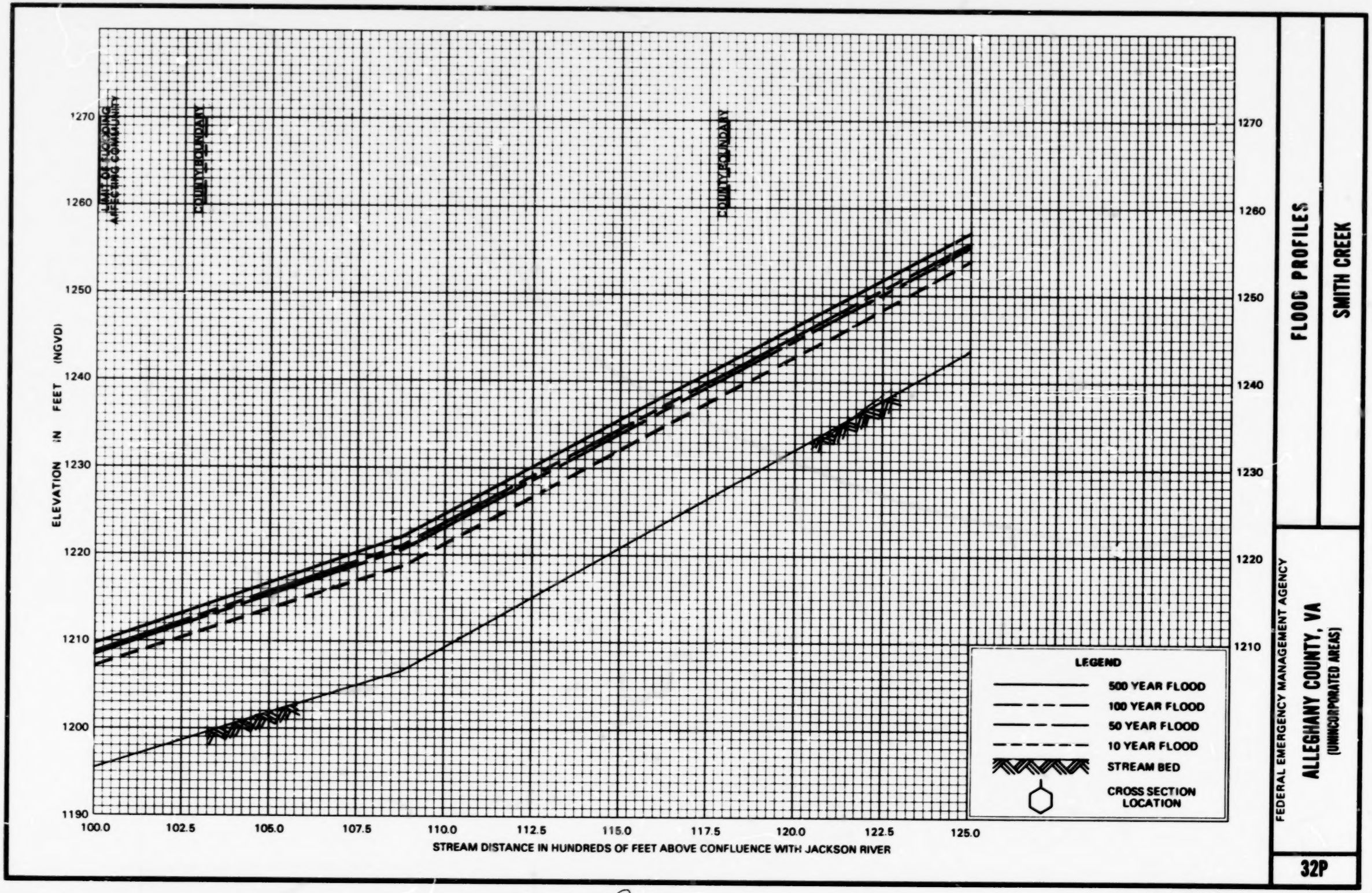

FLOOD PROFILES

SMITH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA

(UNINCORPORATED AREAS)

32P

124466

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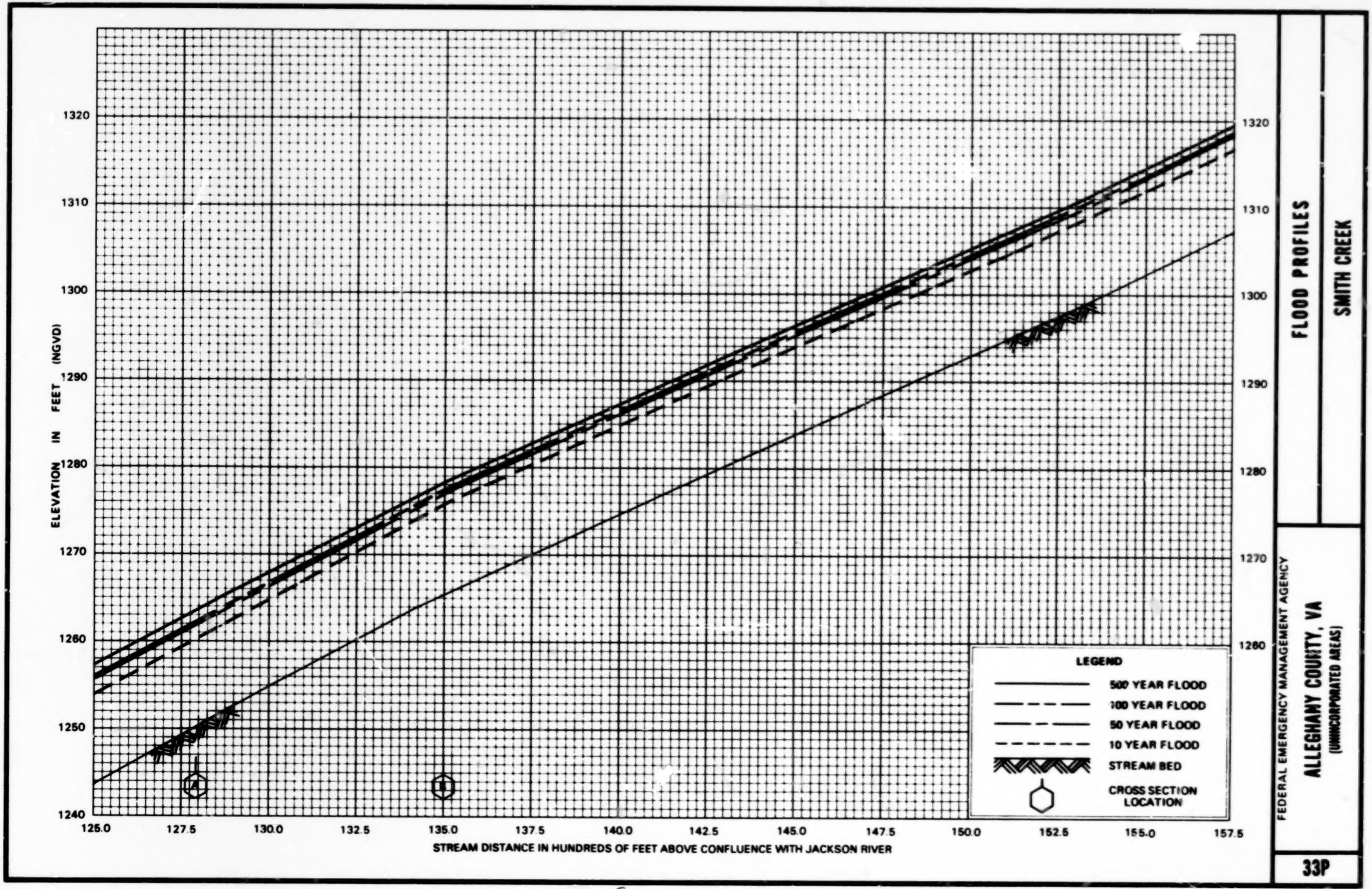

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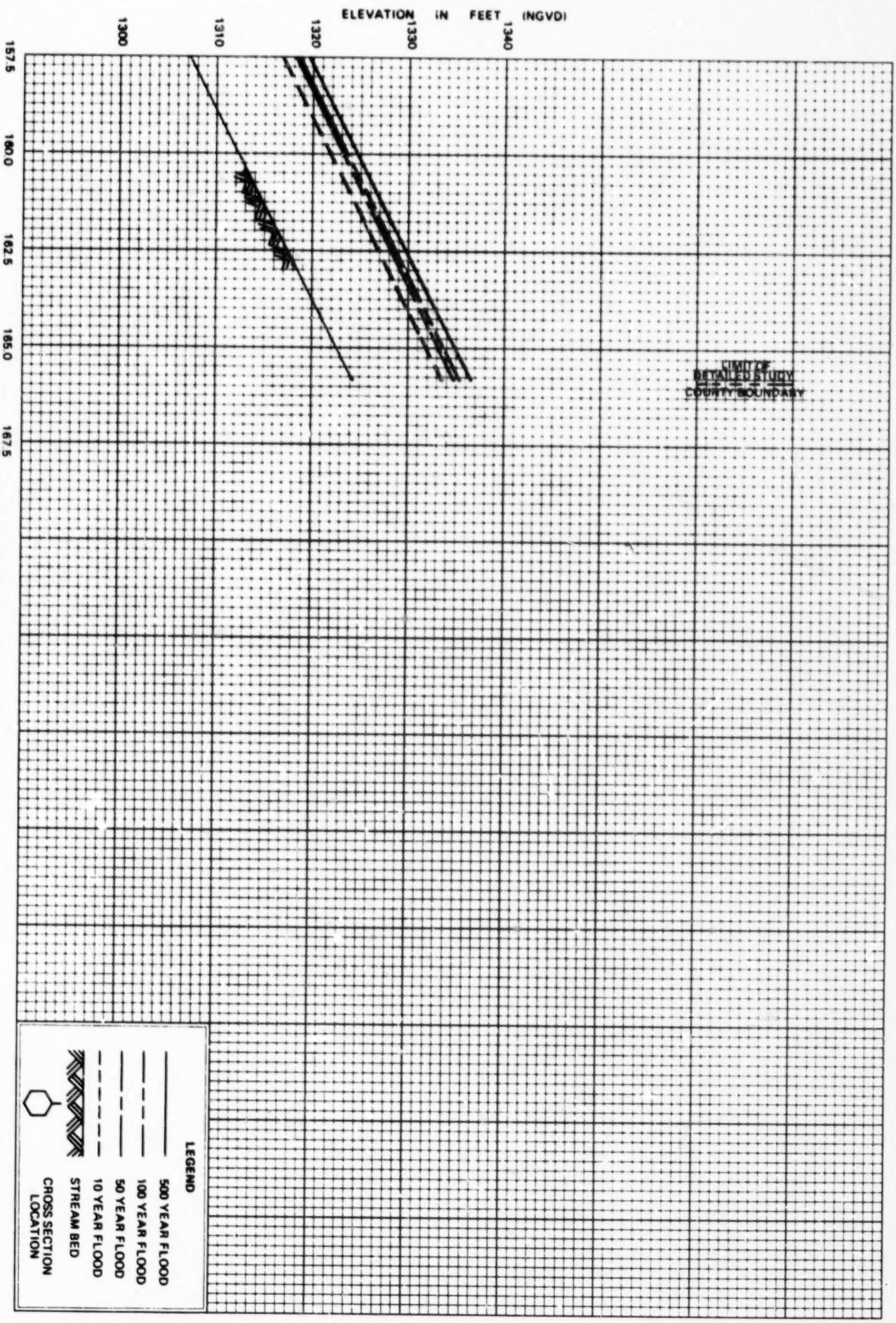

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALLEGHANY COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

SMITH CREEK

34P

93

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